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COMMENTS ON SOME RECENT EXCURSIONS IN THERAPEUSIS.*

By Sir Thomas Horder, Bt., K.C.V.O., M.D., F.R.C.P. Lond.,
PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL.

I have decided to touch upon one or two of the more recent tendencies which have shown themselves in the modern treatment of disease. Time permits of my mentioning only a few of these, and, even so, to take but a glance at them. But this glance is not without interest, especially for those of us who, with sadness be it said, can remember former things, and so take a wider view than might otherwise be possible of the transitions taking place in this as in other parts of medicine.

I have used the word "excursion" in the title of these remarks because I want to convey the idea that, with our limited knowledge of the causes of disease, and of the interactions produced in the body by these causes and the defensive mechanisms that are present, the most that any generation can do in therapeusis is to make tentative inroads into these but partially unexplored regions, with the hope that some resultant benefit may accrue to our patients. Sometimes these excursions are rational, sometimes they are empirical, sometimes they have the elements of great wisdom, and sometimes they are merely wild adventures. They are the result of a widely different series of impulses, which includes the knowledge accumulated by our predecessors, the discovery of new facts in physiology, the provision of new tools in chemistry, in physics, in mechanics, and indeed in all the sciences, the temperament of the doctor, and the tolerance and credulity of the patient. For I take catholicity to be the essence of our outlook in therapeusis, as it is in medicine generally. Unless, of course, we be Nature Curers, and do not believe in drugs; or Spiritual Healers, and do not believe in *any* material aids; or Homœopaths, and slaves to a narrow therapeutic doctrine; or follow some peculiar vogue which, though it may tickle the popular imagination for a time, cannot bring to the service of the sick person what is surely his right to expect, the sum of all human knowledge that can possibly be used on his behalf. No, I assume that we regard medicine as the child of all the sciences, and of all the arts, and therapeusis as the practical issue of medicine, directed towards the maintenance of human health and happiness.

Therefore I omit from my survey this evening all these limited cults, by which therapeusis is "cribb'd, cabined, and confined." I also omit the various excursions that are from time to time made in that dim borderland which lies between a legitimate fostering of the patient's confidence—so valuable a therapeutic asset—and a gross exploitation of his fears and of his hopes. Among the 50,000 men and women who practise medicine in Great Britain there must needs be a few who have never quite mastered the spirit of the Hippocratic oath. Nor of the Golden Rule. And there is that vexed question one is so often asked as to whether a man may, by frequently repeating it, become convinced of the truth of something which is so obviously a lie! And charity bids us say "yes," though, when we see the fellow, and talk to him, the one thing certain is that he should never have been a doctor, but a politician! And so I omit Abram's Box, that nightmare which afflicted us a few years ago, and which I learn is still, like a rat in a hole, nibbling at the purse of that part of the public which thinks an instrument, however ill-constructed, is not likely to err like the fallible human brain. And I omit those Electrotherapeutics that are peculiar in that "no one has an installation like it." And "Bloodless surgery." And "Cheiropractics." And the latest drug from Berlin, "brought over on purpose." And even the exploits of the foreign "Professors" who have a special attraction for many patients because, not being British, they are thought to hold the keys of heaven and of hell in matters hygienic. In most of these excursions we catch sight of the cloven hoof, though the victims themselves elect to charge us with jealousy and ostracism. Credulity, like youth, must be served, and where the carcase is there will the vultures be gathered together. . . . .

Surgery and Endocrine Therapy.

Let me turn to things that really matter. I should like to speak of surgery, if I had time, since I do not agree with my distinguished friend, the President of the College, that even the *craft* of surgery has reached its zenith. Anyway, I am sure that he, too, believes that the *field* of helpful surgery is far from being exhausted. The assistance given to prompt and clean surgery by intravenous therapy and some allied measures is already revolutionising the treatment of shock, as this Society has recently heard during the presentation of the Buckston Browne prize essay. In the surgery of the sympathetic nervous system, of the thyroid gland, and in a number of other directions, the excursion is bold but already amply justified by results. I should also like to speak of endocrine therapy, and of the arrest of certain diseases in which there has been proved to be a loss of hormone control of metabolism, as in the affections associated with calcium dysfunction which formed the subject of Dr. Donald Hunter's recent demonstration to this Society. But all this would take much too long. I will deal only with two interesting and important excursions, and offer some comments upon them. They are the development of irradiation therapy, and the present position with regard to immuno-therapy.

X Rays and Radium.

The discovery of X rays in 1895, and the isolation of the rarer metals—and especially of radium—and their radiations between 1896 and 1901, placed in our hands therapeutic instruments of enormous value. X rays being first rendered available in practical fashion, their application in the treatment of disease preceded that of radium by several years, and until quite recently they constituted the more popular method of employing gamma rays therapeutically. Of late, however, the position has become reversed so much so that in several fields there seems a tendency to discount the value of X rays for purposes of treatment and to confine their usefulness to the field of diagnosis. This seems unfortunate seeing that, as it would appear, we had only just begun to explore the possibilities of X ray therapy at the time when radium therapy overtook the older method in

* Presidential address to the Harveian Society of London on Jan. 14th.

popularity. It is only since the war that reliable and constant apparatus in X ray work have been developed. Accurate dosimetry, and especially the co-relation between physically measured and biological dosage, are, again, of quite recent development; so also is the technique for depth irradiation. It is clear, therefore, that the stage has only been set within the last few years for really accurate observations of the therapeutic value of X rays. A vast amount of ill-controlled work is being done in this sphere, and by practitioners who have not had the necessary training for the purpose. This cannot be in the public interest, and we welcome the institution of a diploma which, supposing it to be adequately safeguarded and of a high standard, will serve to guide the patient and his doctor in the direction of efficiency. As an example of inefficiency may be mentioned the treatment of carcinoma, other than surface lesions, by low voltages, the use of which, besides being ineffective, prejudices the approach for subsequent proper treatment. On the other hand, low voltages have their value in several other directions, and their limits of service, as in the case of high voltages, are still quite unknown.

In the case of radium, no less than in X rays, the technique of administration demands whole-time service. So specialised, indeed, has the work become in the case of these two therapeutic measures that it seems impracticable for the same person any longer to engage in both with any degree of efficiency. Nor is it likely that, in the case of X rays, the same person can, in the patient's best interest, undertake both their diagnostic and their therapeutic application.

The segregation of these two important methods of treatment must needs result in a certain lack of unanimity as to which of them is to be preferred in particular cases. The exponent of either method naturally tends to consider it the fitter of the two, since he gets better results with the familiar, than with the unfamiliar, technique. It therefore becomes a matter of considerable importance that the practitioner, who is directly responsible for the patient, should acquaint himself thoroughly with the possibilities of both methods, since his own judgment is likely to be called upon, more and more frequently, to decide which is the more likely to attain the result desired.

The recent boom in the treatment of inoperable—and in some instances of operable—neoplasms, led to a great demand for radium in this country. The demand was quickly met. It then became apparent that there were not enough trained workers to deal with the radium actually available, and we are to-day witnessing the anomaly of radium going abegging. This position will, however, adjust itself when, on the one hand, workers have become more expert and, on the other hand, when we have extended the list of diseases for which it is reasonable to try the remedy.

Meantime it is interesting to observe that a great deal more experience is required before even the experts are agreed as to the dosage, the frequency, and the field of irradiation, in the case both of radium and of X rays, and even in diseases for which both have been used as a routine method of treatment for several years. A good example of this fact is seen in leukæmia: are the best results obtained from large doses given infrequently, or from small doses given frequently, and should it be the spleen, or the bones, or the glands, or some neutral part or parts, or several of these, that should form the field of irradiation?

Serotherapy.

In the treatment of microbic infections we have seen the swing of the pendulum more than once between bacteriotherapy and chemotherapy. The introduction of the method of passive immunity by means of antisera, and, later, of the method of active immunity by means of bacterial antigens, led to big hopes. In the latter instance, it must be admitted, it led to big business also. During 30 years' experience of these methods there have been great disappointments, and yet, here and there, stimulating successes. In the case of serum therapy it is possible, by further research and trial along two directions, that some of the former hopes may be redeemed. (1) The first direction relates to the determination of different types of the infecting agent within a group, and the preparation of type-sera for use in homologous infections. Efforts have already been made along this line in the case of the pneumococcus and the meningococcus. In the even more important group of streptococci, though the difficulties are greater, a similar effort may yet be rewarded by good results. (2) In a second direction hope springs afresh. It has been held for a long time that the exotoxins produced during culture were not of service in the preparation of antisera in coccal infections. They were for the most part carefully separated off from the bodies of the cocci, which alone were used for the immunising inoculations. The resulting serum was therefore described as bactericidal or bacteriolytic. It has been found more recently, however, that a much more potent serum results from the use of these exotoxins together with the endotoxins. These newer exotoxin-sera are now on trial, and some of the results of their use, especially in acute and virulent infections by *Streptococcus pyogenes* (vel *hæmolyticus*), have been strikingly good. These sera, having been chiefly obtained by the use of streptococci from the throat in severe cases of scarlet fever, have been somewhat unfortunately labelled "scarlatinal anti-strep. sera." They are, however, quite as useful in streptococcal infections other than in scarlet fever as they are in this disease itself.

Vaccines.

The "opsonic index" hypothesis gave a semblance of reasonableness to vaccine therapy without which the early hopes entertained on its behalf would probably have dwindled much earlier. Now that we must regard the method as entirely empirical the field is free for fuller exploitation, and that it has certainly had in no small measure. But though we have served out to the tissues of the infected patient specific antigen in divers ways—dead, living, "detoxicated," "sensitised"; as endoplasm, as ectoplasm; and by divers systems of dosage—minute doses frequently, a massive dose singly, and by all gradations and with various intervals; the very cases of infection in which we most need help seem to elude all these processes. And yet it must be admitted that here and there the general methods at our disposal for combating pyogenic infection in individual cases seem to receive striking assistance from antigen therapy. To those of us who have formerly inclined strongly towards this method, consideration of the present position with regard to the treatment of such diseases as pulmonary tuberculosis, septic endocarditis, and staphylococcal pyæmia, for example, must needs cause a feeling of discontent. For in all three of these diseases we rely to-day upon exactly those measures of a general, non-specific sort that we did a quarter of a century ago. But here again it

would be foolish to suppose that we have seen the limits of the method of active immunisation. We may have missed the optimum possibilities of the method by just a little, and we may one day hit upon, or stumble upon, some modification of our present techniques which will make all the difference between the frequent failures which cause so many to be frank disbelievers to-day, and such uniformity of good results as will convince the most sceptical. The suggestion that better results might be obtained if we took pains to bring the antigen into more immediate and direct contact with the tissues which are the main site of infection is only now being followed up.

A new chapter has been opened quite recently in connexion with bacteriophages. Concerning these, the work so far done, both in the laboratory and by the bedside, is too meagre to call for detailed comment.

Chemotherapy.

Chemotherapy received a marked fillip with Ehrlich's introduction of 606. Within a few years there was scarcely any infection that had not been treated by the method. No doubt many lives were lost in consequence, though it is probably true to say that in most of these instances recovery would not have occurred had the remedy not been used. To-day we do not regard the drug, nor its more modern equivalents, as being directly germicidal, as Ehrlich did, and we have found that its indirect germicidal effect is limited to a somewhat narrow field. We are also beginning to realise, having given up the ideal of a *therapia sterilans magna*, that the intravenous route is by no means necessary, and may at times be inferior to the older route of the muscles. But the success of 606 gave a general stimulus to the use of germicidal preparations in pyogenic infections. The use of perchloride of mercury was reintroduced, but its place was soon taken by less toxic mercurial compounds such as the salicylate, and especially mercurochrome. In this substance the coagulative property of mercurial salts is greatly reduced, whereas penetration is aided by the introduction of the aniline dye fluorescein. Though far from being an ideal blood antiseptic, it is perhaps the nearest approach to this that we at present possess. The most sensitive tissue which it meets in the course of its action is the kidney, and, since damage done to this organ is so apt to be permanent, the use of mercurochrome calls for the utmost care.

Specificity of Remedies.

Of late years we have seen a reaction against the doctrine of specificity in the therapeusis of microbic infections. This reaction has shown itself in the field of bacteriotherapy and also in the field of chemotherapy. We have seen the introduction of protein shock, and also of what not seldom—though this effect is perhaps not intended—results in chemical shock. Such treatments have their basis of reason in the hypothesis that the mechanism of Immunity is generic rather than particular, and that it may therefore be activated by the same stimulus though the disease be caused by quite different species of infecting agents. Such a conception is fundamental, but the evidence supporting it is at present too slight to warrant its acceptance as a sound basis for a scheme of therapeusis in infective diseases generally. As usual, it may possibly be found that the truth lies somewhere between the two extremes, of specificity and non-specificity. The supposition, for example, that a dose of staphylococcal antigen may so jostle the immunity mechanism—evidently a very elaborate affair—as to leave the patient somewhat better when a state of relative equilibrium is once more established, and that this may happen even when the infection is bacillary in origin: such supposition is not incompatible with the view that an additional, and perhaps more valuable, benefit is derived from such administration in cases in which the infection is homologous with the particular antigen used, in this case staphylococcal. Even the idea of a "provocative reaction" may not be so specific as is usually supposed. The danger lies in assuming a simple interaction, or a single one, or a direct one, when all the time it may be complex, multiple, and indirect. There can be no harm in exploiting these new remedies and these ideas to the full provided we keep an open mind as to the nature of the interaction, and, it may be added, provided we use forbearance in accepting the explanation that fits with our own preconceived ideas, and decline to consider other and alternative ideas.

But since we are dealing always with an organism which possesses defences of its own, it behoves us to be careful that our reputed remedies do not merely add to the load the patient has to carry, and thus put a drag upon his natural resistance to his disease. This is an age of hustle, and a lust for the royal road to recovery is everywhere apparent. We are prone to forget that, though we may hope to shorten the course of an infection by our intervention, the chance of our being able to substitute an entirely different set of interactions from those by which the tissues reassert their criterion of health is remote. I do not myself find it difficult to visualise a remedial agent which shall expedite the natural course of recovery from an infection. There would often appear to be a lag in this natural process which, quite conceivably, might be overcome by appropriate means. But this raises the question as to whether the patient possesses a reserve in his immunity mechanism which can be called up for our purpose. And it may well be that this is a matter varying considerably in different individuals.

We get hints of this being actually so. Though, like many other of their terms, the words "sthenic" and "asthenic," used by our teachers of some thirty years ago, lacked clear definition, they undoubtedly correspond with observed clinical pictures. And, as one man's meat is another man's poison, so, I suggest, the contents of a hypodermic syringe that are found to be tolerated, or even appreciated, by one patient, may be definitely harmful to another, and yet both may be stricken by the same infection. That a dose of X.Y.Z 42 "will often enable an influenza patient to resume work on the third day" (I quote the advertisement) is not a controvertible statement, because a lot of other remedial measures have exactly the same to their credit; and provided the attack is quite a mild one, these measures may not have included any drugs whatever. But that (to quote again) "there is definite clinical evidence that the effect of injecting X.Y.Z 42 in the early stages of influenza is to reduce by one-half the duration of the disease and its accompanying symptoms" is a matter which must be left to the members of this Society and other equally competent observers to decide, rather than to the makers of the drug.

Concerning another preparation which I will call Angelina (said to contain "specific antibody," which is exactly what it does not contain) in the treatment of pneumonia we read—and the

statement is italicised—that "recovery begins on the first day." The evidence given for this claim is that there is "a fall in the temperature six hours after each injection." But this, of course, is no necessary sign of betterment; it may be the converse. As to recovery beginning on the first day, it may be safely presumed that, in any infection, the patient begins to recover—or to die—on the first day. This is quite compatible with, indeed it is a direct inference from, all that we know about immunity.

The number of these substances that are to-day being used in combating infections is considerable, and increases almost weekly. They are for the most part complex bodies possessing very large molecules. Their use is by some based upon the hypothesis that the protective power of the plasma resides in a number of protein particles that circulate in this medium, and that these particles can be "condensed" or "dispersed" by the injection, intravenously or intramuscularly, of the chemical substances referred to. How much of this hypothesis is known, or understood, by the majority of those who employ these therapeutic agents is doubtful; perhaps such knowledge is not necessary; but the confidence of those of us who are as yet unconvinced of the efficacy of these remedies is not enhanced by the somewhat casual manner in which the typical devotee of this particular school speaks of his exploits: "I plugged him with X.Y.Z." . . . "I fired in Angelina." . . .

But given a little forbearance, and some commonsense, I think these remedies should by no means be condemned out of hand. What is more important, however, is that the physiologists should come to our rescue. Either there *are* particles in the blood plasma, or there are not; and, if there are, either they *are* "condensed" and they are "dispersed" by the injection of certain chemical substances, or they are not. I cannot find that anything is known with certainty about these fundamental things; and research into them seems urgently called for. At present the issue is confused, and perhaps the method is prejudiced, by the business enterprise of the manufacturer and by the ease with which he converts the busier and less sceptical members of the profession. If the syndicates who run these things really want to establish their remedies, let them set aside some of the money they are making to biological research. At present their extravagant claims have far outrun the flimsy basis of fact upon which they are based.

Progress of Therapeutics.

Medicine has been termed an "inexact science." And by some confusion of thought this old saw has by many been considered to represent a permanent state of affairs. But much in medicine that was inexact yesterday is exact to-day, and much that is inexact to-day will doubtless be exact to-morrow. And it is but to change the words rather than the facts if we say that what is empirical to-day will become rational to-morrow. In many things therapeusis lags behind pathology, but pathology should always be prepared to get an inspiration from therapeusis. It is right, because it is useful, that therapeusis should continue to push out its antennæ, in this and in that direction, hoping to feel new facts that even pathology has not found. These, if found, should be explored by pathology, so that the remedy chosen might have the three time-honoured cardinal merits for which every patient rightly pleads—it should cure safely, pleasantly, and swiftly.

ACTIVE IMMUNISATION AND DIPHTHERIA.

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NEARLY three years ago we communicated to THE LANCET [1] a note on the active immunisation against diphtheria of Greenwich Hospital School (G.H.S.). In this institution of 1000 boys the fact was recorded that the cases of diphtheria *which were notified* had decreased from about 5 per cent. per annum, before immunisation, to zero among the inoculated boys during the year after immunisation. In that paper we admitted that two cases "whose throats suggested a diagnosis of diphtheria" were not notified, although virulent bacilli had been isolated from their throats; because we considered, rightly or wrongly, that they were diphtheria carriers suffering from a coincident infection. At the time, Dr. E. W. Goodall [2] gently rebuked us for having "decided not to recognise these cases as diphtheria," because, as he justly said, "the slightest attempt to gloss over a failure will lead to the discredit of the practice of immunisation." The reprimand was deserved, for the statistics from one point of view were undoubtedly, though unintentionally, misleading, and form an instructive example of how would-be honest men are led by subconscious bias to overstate their case.

For the specific purpose of comparing the incidence of a disease before and after a certain event, it is obvious, or should be, that the definitions of the disease, and the criteria for diagnosis, must remain identical throughout the investigation, however much the event in question may suggest that the modification of definition or criterion is advisable.

"OFFICIAL" AND "REAL" DIPHTHERIA.

Before the immunisation of G.H.S. it had been customary, as elsewhere, to notify as diphtheria practically every patient who had a sore-throat in which diphtheria bacilli could be demonstrated. In order to simplify discussion, all cases which satisfy these two criteria, sore-throat and diphtheria bacilli, will be classed as "official" diphtheria. Prior to immunisation, "notified" and "official" diphtheria were identities—subsequently they were not. If now "real" diphtheria is defined as any lesion caused by the toxins of *Corynebacterium diphtheriæ*, it is improbable that all cases of "official" diphtheria are "real." On the other hand, for practical purposes, all "real" is also "official" diphtheria. Because, although a case, clinically diagnosible as diphtheria (which is of course notified), sometimes occurs in which the bacteriological examination is negative, yet such an event is far too rare, in a laboratory accustomed to diphtheria work, for it to have any effect on the subsequent argument.

During the 6¼ years (19 terms) prior to active immunisation, it was routine at G.H.S. to swab every throat, irrespective of its clinical appearance or severity. In this period 1439 sore-throats (including diphtheria) were examined. Diphtheria bacilli were found in 319. These cases of "official"

diphtheria were notified. In the 3¾ years (11 terms) following the immunisation of the school, the routine of swabbing every throat was allowed to lapse; and only 345, out of the 834 cases of total sore-throats, were swabbed in this period; 19 cases of "official" diphtheria were discovered, but of these only four were notified. Therefore there was nearly a tenfold reduction in the incidence of *discovered* "official" diphtheria after immunisation—from 50·7 to 5·2 cases per annum. But even these two rates are not fairly comparable, because the criteria which are used for classifying "official" diphtheria take no notice of the clinical type of sore-throat. Therefore when, as before immunisation, all sore-throats are taken, the morbidity of "official" diphtheria equals the product of the morbidity from all sore-throats and the incidence of diphtheria bacilli in sore-throats, which before immunisation was 22·2 ± 0·8 per cent., while in the same period the morbidity of sore-throats averaged 227 cases per annum. The product of these two rates is 50·7—the morbidity of "official" diphtheria before the active immunisation of G.H.S. The incidence of infection with diphtheria bacilli in those sore-throats which were swabbed after immunisation was 5·5 ± 0·8 per cent., and since the total sore-throat morbidity during the same period was 228 per annum, the product of these two rates would be 12·5. Supposing, therefore, the 345 throats which were examined had been selected at random, then the number of "official" diphtheria cases, more than half of which would not have been discovered, should have been 12·5 per year instead of the 5·2 which were actually discovered. The fall in the morbidity of "official" diphtheria after immunisation would then have been only fourfold—from 50·7 to 12·5 cases per year. One may note in passing that the average yearly morbidity of total sore-throats, including diphtheria, was equal in both periods. Therefore the morbidity of sore-throats, excluding "official" diphtheria, was greater after immunisation by about 38 cases per year.

Of course, in practice, unless all sore-throats are taken, those which are examined for diphtheria bacilli are always subject to a greater or less degree of selection. However, at G.H.S. after immunisation the large majority of sore-throats were examined more out of curiosity than with any idea that they resembled clinical diphtheria, though, of course, any that were clinically suggestive of diphtheria were specially selected. Nevertheless, seeing there was practically no *clinical* diphtheria at this time, and considering the large fraction of all throats which were swabbed, their selection must have been nearly at random. Hence, if after, as before, the immunisation of the school, all sore-throats had been bacteriologically examined, the incidence of "official" diphtheria would have been nearer 12·5 than the 5·2 cases per annum which were discovered.

ESTIMATED "REAL" DIPHTHERIA.

If it is allowed that diphtheria carriers can acquire non-diphtheritic infections of the throat, or that ordinary sore-throat patients can become diphtheria carriers, then it is obvious that a certain proportion of "official" diphtheria is not "real." It is also evident that the higher the morbidity of non-diphtheritic sore-throat, and the higher the diphtheria carrier-rate, the greater will be the error in diagnosis, when diphtheria is notified on the "official" criteria (non-diphtheritic" = not in any sense due to *C. diphtheriæ*).

For the sake of illustration it is assumed non-diphtheritic sore-throats and diphtheria carriers are distributed independently and at random in a community, then, the carrier-rate being known, the proportions of "real" and "carrier cases" in a random collection of "official" diphtheria patients can be calculated. For example, during the 6½ years prior to immunisation, the frequency of symptomless infection with *C. diphtheriæ* among 4827 healthy boys was 6·1 ± 0·2 per cent. Therefore, on the above assumption, the 319 "official" cases of diphtheria, which were collected at a time when all sore-throats were swabbed, consisted of 254 cases of "real" diphtheria and 65 carriers who had a coincident sore-throat. (Let x = number of "real" and y = number of "carrier" cases; then $x+y=319$ and $6{\cdot}1\,(1439-x)=100\,y$; whence $x=254$ and $y=65$.) Similarly, the healthy carrier-rate after immunisation averaged 3·7 ± 0·2 per cent. (3052 swabs); whence, with the additional assumption that the sore-throats were selected at random for swabbing, out of the 19 "official" cases which were discovered, only seven cases of "real" diphtheria would have been expected. According to these calculations, the estimated incidence of "real" diphtheria before and after immunisation was respectively 40·0 and 1·9 cases per annum; and the percentage of "real" diphtheria among the swabbed sore-throats was 17·6 ± 0·8 and 2·2 ± 0·5, but among all sore-throats these frequencies would have been 17·6 and 0·8 per cent., if we assumed that all the "real" cases of diphtheria would have been selected for swabbing. It is possible, if not probable, that "commensal" or carrier infections with *C. diphtheriæ* are more frequent in the subjects of non-diphtheritic sore-throats than in healthy individuals. If such is the case, then, other things being equal, the frequency of "real" among "official" cases of diphtheria would be even less than is suggested above.

THE DIAGNOSTIC ERROR IN "NOTIFIED" DIPHTHERIA.

The 20 per cent. error in the diagnosis of diphtheria, as estimated in the last section, is more than confirmed by clinical diagnosis. In 1921 and 1922 we ourselves considered that, of 127 cases of "notified" and "official" diphtheria, 38 (30 ± 3 per cent.) were not diagnosable on clinical grounds only. This result was independently confirmed in 1925 to 1927, when, in answer to our inquiry, Dr. T. H. Woodfield, superintendent of the Brook Fever Hospital, most kindly took the trouble to look up his sick records, and informed us that 34 (41 ± 3·6 per cent.) of 83 G.H.S. "official" cases sent to his hospital were, in his opinion, "not clinically recognisable as diphtheria." During this period, however, the ratio of avirulent diphtheria bacilli was exceptionally high, and the type of "recognisable" diphtheria was considerably milder than in 1921. More evidence of the extent of the diagnostic error in the notification returns of diphtheria is supplied by Caiger and O'Brien,[3] who found 41·7 ± 1·3 per cent. of patients, notified as diphtheria and sent to the London fever hospitals, were not clinically, or even bacteriologically, diphtheria. As at G.H.S., these experts found if a case was clinically "positive" that, for practical purposes, it also was always bacteriologically "positive." But, contrary to our experience, unless we have misunderstood their data, which is not very clear on this special point, the sore-throats in the fever hospital group, which were not clinically recognisable as diphtheria, were all "negative" on bacteriological examination. Since the diphtheria carrier-rate among the London County Council school-children is, and has been for

some years, approximately the same as the average rate in G.H.S. prior to immunisation, Caiger and O'Brien's paper, if we interpret it correctly, would suggest that a non-diphtheritic sore-throat in a diphtheria carrier must be rare. This discrepancy between the "official" cases at G.H.S. and the "notified" cases which were sent to the London fever hospitals is perhaps caused by the excessive number of ordinary sore-throats which were swabbed at G.H.S.

In any event it is very evident, provided the error in the diagnosis of notified diphtheria is as high as the fever specialists think, that even if active immunisation should ever prove successful in completely eradicating "real" diphtheria from a community, it could not effect the 40 per cent. of false notifications. However, that part of the error in diagnosis, caused by notifying carriers with non-specific throats, would diminish if the carrier-rate is reduced as a result of active immunisation. One may note here that, although the average carrier-rate at G.H.S. fell after the immunisation of the school, yet the fall was largely caused by the disappearance of avirulent *C. diphtheriæ*. Large carrier-rates are nevertheless compatible with a fully immunised population. More than two years after G.H.S. was fully immunised, a sample of 93 healthy boys, the inhabitants of one dormitory, were swabbed, and eight cultures of toxigenic *C. diphtheriæ* were isolated from among them—an $8{\cdot}6 \pm 2$ per cent. virulent carrier-rate in a sub-group, all but one or two of whose members had negative Schick reactions. The fever specialists have demonstrated how the official notifications of diphtheria must form an inadequate index on which to judge the effect of any prophylactic scheme directed against diphtheria. It would seem that a better index would be the frequency of false clincial diagnoses among the cases sent to the fever hospitals as diphtheria. When this frequency approached 100 per cent. we could feel certain the preventive measure was a success.

It is a curious paradox that the more careful a physician is to exclude (*sic*) diphtheria by swabbing sore-throats which are not clinically diagnosable, the greater may be his error in diagnosis, though he will, of course, miss fewer cases of "real" diphtheria.

DIPHTHERIA IN SCHICK IMMUNES.

The high degree of immunity to severe clinical diphtheria which is exhibited by Schick immunes has been discussed elsewhere.[4] Suffice it to say that Park,[5] whose experience is unrivalled, says he has never seen an undoubted case of diphtheria in a subject possessing an undoubted negative Schick reaction; and our limited experience at G.H.S. is in agreement with this dictum, as the subjoined Table of the 19 "official" diphtheria cases which were discovered after the immunisation of G.H.S. shows. In this table the four "definite" cases, which were the only ones notified, are lettered A to D. A, B, and C were new entries who contracted diphtheria before being inoculated. A and B had positive Schick tests which remained positive after their return to school until they were artificially immunised. Case C was sent to hospital with jaundice before he was Schick tested, and developed diphtheria while in hospital. On his return to G.H.S. his Schick test and throat swab were both negative. Case D deserves special mention as the only boy with a negative Schick test who was notified as diphtheria.

This patient reported sick on March 8th, 1931, with an indefinite sore-throat. On March 10th there was a large greyish patch of membranous exudation on the right tonsil. Temperature was 100·4° F. He was sent to the fever hospital, and virulent bacilli were recovered from a throat swab taken at G.H.S. He was perhaps not an undoubted case of diphtheria, but he was the negative Schick reactor who most resembled it. Moreover, this subject had had four consecutive positive Schick tests, and five inoculations of full strength toxoid, before his fifth Schick test in October, 1930, was negative, about eight months after his joining school, and five months prior to the onset of symptoms. His Schick test, on return from hospital in May, 1931, was still negative.

With three doses of the diphtheria antigen as used on this case over 95 per cent. of any natural group of Schick susceptibles should acquire Schick immunity within three months, which suggests such subjects as Case D, who are exceptionally refractory to artificial active immunisation, are especially susceptible to clinical diphtheria.

Table of "Official" Diphtheria Cases Discovered after the Active Immunisation of G.H.S.

Case reference.	Date of onset of sore-throat.	Months at school before illness.	Schick test on entry.	Prophylactic inoculations.	Last Schick test before illness.	Virulent (V) or Avirulent (A) *C. diphtheriæ*.	Clinical diagnosis of diphtheria.
A	June /28	0	+	0	+	V	Def.
1	Oct. /28	5	−	0	−	V	Indef.
2	Oct. /28	11	−	0	−	V	,,
3	Jan. /29	8	+	2	−	V	,,
4	Apl. /29	3	+	1	+	V	Neg.
5	Oct. /29	32	+	1	−	?	Indef.
6	Dec. /29	26	+	3	−	A	Neg.
B	Jan. /30	0	+	0	+	V	Def.
7	Feb. /30	24	−	0	−	?	Indef.
8	Mar. /30	11	+	3	−	V	Neg.
9	Apl. /30	1	+	3	+	V	Indef.
10	July /30	2	−	0	−	V	,,
11	July /30	1	+	2	+	V	Neg.
12	Sept./30	9	+	2	−	?	,,
13	Oct. /30	24	+	2	−	V	,,
C	Nov. /30	0	?	0	?	?	Def.
D	Mar. /31	13	+	5	−	V	,,
14	May /31	4	−	0	−	?	Indef.
15	May /31	13	+	2	−	?	Neg.

A-D, "notified" cases; 1–15, cases not recorded as diphtheria; ? = "unknown"; def. = definite; neg. = negative.

We will now consider the 15 "official" cases of diphtheria, but which were neither notified nor recorded as diphtheria in the school records. Eight of these patients have been classed as having an "indefinite" clinical diagnosis. On clinical grounds only, the probability of their being "real" diphtheria was small, unless a large proportion of the 326 sore-throats, in which the swab was negative, were also diphtheria. The remaining seven cases, labelled "negative," had injected catarrhal sore-throats and no sign of any membranous exudation. They were less like diphtheria than dozens of other patients who had "negative" throat swabs. None of these 15 boys were really ill, and in all cases the symptoms cleared up in a day or two. They were, however, kept under observation till their throat swabs were "negative." Cases 9, 11, and 13 "carried" virulent bacilli for over two months. It was the invariable rule at G.H.S. that any case which had more than trivial symptoms, suspicious of diphtheria, was given antitoxin without awaiting the laboratory report. Only Case 1 in this group received any diphtheria antitoxin, which is perhaps the best indication of their clinical resemblance to diphtheria. Cases 4, 9, and 11 got "official" diphtheria during their prophylactic course. Their Schick reactions were positive 1, 5, and 21 days respectively before the onset of their sore-throats. In each case another Schick test, about a month after the onset of the sore-throat,

was negative. These three boys probably represent the mildest type of "real" diphtheria patients, who respond rapidly to infection by becoming Schick immune, in contrast to clinically recognisable cases, such as A and B, who, as a rule, remain Schick susceptible after their recovery.

C. diphtheriæ was isolated from 10 of these 15 cases, and nine of the cultures were toxigenic. This predominance of virulent cultures cannot be used as an argument that most of this group were cases rather than carriers. Because, although a few carriers of avirulent diphtheria bacilli were discovered when swabbing boys on entry, yet Case 6 was the only boy who had been more than a term at G.H.S. from which an avirulent culture of *C. diphtheriæ* was obtained after September, 1929. Between this date and July, 1931, 23 consecutive cultures of *C. diphtheriæ* isolated from the throat swabs of healthy boys were all toxigenic.

Of the 13 negative Schick reactors (including case D) who got "official" diphtheria, eight (61 ± 8 per cent.) were originally Schick susceptible on entry, but had been "artificially" made Schick immune before contracting their sore-throats. The other five were "naturally" Schick immune on entry. Fifty-seven per cent. of all the boys who joined G.H.S. after the school had been immunised had positive Schick reactions on entry. Therefore there was little evidence as to whether "natural" or "artificial" Schick immunes were the more susceptible to "official" diphtheria.

As a group, the 15 cases of "official" diphtheria, which were not notified, had no outstanding clinical characteristics to distinguish them from those patients in whose sore-throats *C. diphtheriæ* could not be demonstrated. Hence, because no one can say for certain whether or not any *individual* case of "official" diphtheria, which is not clinically diagnosable, is caused by the toxins of *C. diphtheriæ*, the question may appear to be an academic quibble of no practical importance. Nevertheless, the *group* phenomena, discussed in this paper, support the hypothesis that many, if not the majority, of such cases of "official" diphtheria are subjects whose coincident infection with *C. diphtheriæ* has no ætiological relation with their sore-throat; while the remainder are very mild, but "real" diphtheria cases in subjects who are partially immune. If this hypothesis is true we are faced in practice with more or less of an impasse; because the majority of diphtheria cases will always be missed, unless the majority of all types of sore-throat are swabbed, irrespective of their clinical character. Or, put in another way, because, apart from the text-book case, one type of sore-throat suggests diphtheria as much as another. This does not only apply to an institution such as G.H.S., because diphtheria carrier-rates, and sore-throat morbidities as high as those reported in this school, are by no means infrequent outside it.

INDIRECT EFFECT OF ACTIVE IMMUNISATION ON NOTIFICATION.

The experience of active immunisation at G.H.S. forces home the practical lesson that, provided a case is known to have an undoubted Schick negative reaction (not merely to have had a prophylactic course of inoculations), the throat swab can be discarded, and such sore-throats diagnosed and treated on their clinical face value. Thus, active immunisation by an indirect psychological action reduces the number of diphtheria notifications in two ways. First, the confidence produced by the knowledge the patient and all his contacts are Schick immune, prevents the physician from notifying any type of sore-throat as diphtheria, and sending him to a fever hospital merely on the safety-first principle. Thus the positive error in diagnosis is diminished. Secondly, the mild, indefinite, and transitory cases of "real" diphtheria, which admittedly sometimes occur in Schick immunes, will often be "missed" if the throat swab is not regularly used, or, if it is used, such cases may be classed wrongly as "diphtheria carriers with coincident sore-throats." In this way the negative error in diagnosis is increased. These were the indirect effects of active immunisation which Dr. Goodall[2] spotted in our first communication. We have tried hard this time to eliminate our conscious prejudice in favour of active immunisation, but of course we cannot remove any fraction of bias which may remain buried in our subconscious minds.

CONCLUSION.

To summarise, the extent of the reductions in diphtheria-rates which were observed in the 3½ years following, as compared with the 6½ years preceding, the active immunisation of G.H.S. are as follows:—

Notifications of diphtheria per annum	46 times less.
Estimated "real" cases of diphtheria per annum	21 ,, ,,
Discovered "official" cases of diphtheria per annum	9·8 ,, ,,
Frequency of *C. diphtheriæ* in sore-throats ..	4·0 ,, ,,
,, ,, ,, ,, in healthy boys ..	1·6 ,, ,,
Morbidity of all sore-throats per annum ..	equal.

We personally believe that the most important cause of all the above reductions was the immunisation of the school; but we expect that many medical men will prefer to adhere to what is perhaps the "common sense" view, that, for practical purposes, "KLB positive" plus a "sore-throat"—i.e., our "official" diphtheria is always "real" diphtheria (see definition in section 2). If we accept this hypothesis, we will have to admit that the continued maintenance of Schick immunity in 97 per cent. of the inhabitants of G.H.S. was, with certainty, only followed by a fourfold reduction in the incidence of "common sense" diphtheria. Nevertheless, even had no change taken place in the "clinical severity," or duration of the disease, this reduction was more than worth while from any point of view—medical, financial, or educational. But in our opinion (which of course must be biased), if the morbidity of diphtheria is only granted a fourfold reduction, the "clinical severity," which then becomes relatively far more important than morbidity, must have declined at least a hundredfold after active immunisation.

Our thanks are due to Surgeon-Commander T. C. Patterson, R.N., who, after February, 1930, was responsible for the technical immunology and bacteriology at G.H.S. Also to Dr. R. A. O'Brien, of the Wellcome Research Laboratories, who supplied the prophylactic agents used in G.H.S.

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WAKING HOUR OF HOSPITAL PATIENTS.—The central public health committee of the London County Council have decided that, save in special circumstances, no patient in the Council's hospitals is to be awakened earlier than 6 A.M. Where, owing to insufficiency of staff, this rule does not yet apply, it will be put into operation as soon as circumstances permit.

THE MIND IN TUBERCLE.

By Andrew Morland, M.D., M.R.C.P. Lond.,
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In the treatment of tuberculosis, healthy living is all-important, other remedies being no more than adjuvants, and in themselves useless to stay the progress of the disease if the mode of life is unhealthy. Since the course of the illness is invariably long much depends on the condition of the patient's mind, which must be such as would enable him to make a consistent effort towards recovery. It seems at first sight that there should be no great difficulty in carrying out so simple a régime as that described in the dictum, rest, fresh air, and good food; none the less it is common knowledge that many people with tuberculosis have not the endurance to carry out this mode of life for a sufficient period, and a large proportion of them throw away their lives as the result of this failure to adapt themselves to a suitable environment.

If the tuberculosis physician could learn so to influence the minds of his patients that they acquired a proper attitude towards the disease, the greatest therapeutic advance of the century would have been achieved.

Sound therapy can only be based on a proper understanding of pathology, and it is therefore necessary in the first place to study as fully as possible the mental states observed in persons with tuberculous disease. This problem is a vast one, as people of every type of mental make-up are liable to fall victims to tubercle, and in the present state of knowledge it is possible to attempt only a somewhat sketchy review of the subject.

ÆTIOLOGY.

That the resistance to tubercle and other diseases may be lowered as the result of a severe psychic trauma has long been admitted. More recently much has been written concerning the psychological "flight into disease." It is certainly not uncommon to meet with patients, especially in tuberculous families, who show many of the symptoms of phthisis but in whom physical and radiological signs are consistently absent. It is probable that many of these are suffering from purely psychological phthisis. Groddeck in his delightfully stimulating book "The Unknown Self" elaborates the theory that the organism deliberately makes use of a germ to attain its own ends. Although the results of experimental and accidental inoculation make it impossible to accept this theory in its entirety, there is much truth in it, and few will dispute the modified statement that illness is likely to follow when all desire for life and health have gone. The importance of the mind in the ætiology of consumption was clearly recognised by the late Arthur Latham who said [1] in 1917:

> "The increase of tuberculosis during the war could not be explained by increased infectivity, but could be explained by the increased strain and stress. We could only remove the disease by removing the strain and stress of working people; until this were done the result would be as unsatisfactory as at the present time."

In this connexion it is not out of place to point out that a strong case has been made for the psychic origin of such diseases as exophthalmic goitre and epilepsy which were long considered as purely organic.

Although, as has been said, any type of person may get tubercle, there does appear to be a particularly high incidence on those of outstanding intelligence, and the victims of the disease include a large number of men and women of genius. From this observation has arisen the idea that the toxin of tubercle stimulates creative capacity. This theory does not bear close examination, and it seems much more probable that the intensity of feeling and thought required for creative work, so often allied to an acute sensitiveness and vulnerability towards the inevitable harshness of a workaday world, make the genius a particularly easy victim to such a disease as tuberculosis. Dilke, shortly after the death of Keats, wrote: "Thought was intense with him and seemed at times to assume a reality that influenced his conduct and I have no doubt helped to wear him out." Such people have great difficulty in adapting themselves to their surroundings.

[1] THE LANCET, 1917, ii., 792.

REACTION TO DIAGNOSIS.

It is a common observation that when the onset of tubercle is dramatic, for example by a profuse hæmoptysis, steady progress towards recovery is often made. With less conclusive proof of the presence of serious disease the attitude of the patient is apt to be incredulous; he shrinks from facing unpleasant facts, and will take any loophole for disputing the accuracy of the diagnosis. Medical men are the worst offenders in this respect, and I have met with arguments designed to prove that the acid-fast organism abundantly present in the sputum was not the tubercle bacillus. Even when convinced of the presence of the disease the majority of patients are outwardly confident that they will be quite well in three months or some equally unreasonable time. This attitude is in strange contrast with that of a man when one of his friends is sent to a sanatorium, for in this case it is usual to meet with a gloomy view, based on childhood memories of the usual fate of "consumptives" and on the excessively low rate of recovery from phthisis in works of fiction. The opposite type of reaction in which the patient shows extreme shock and fear is also common, but tends to be of shorter duration and thus of less consequence. Interesting cases are met with in which both incredulity and terror are present, first one and then the other dominating the scene.

DURING TREATMENT.

The patient who shows a proper combination of courage and caution, adaptability to a new environment, and the capacity to form fresh interests when the old ones are inadvisable, has a good prospect of recovery even when the disease is of moderate severity. Unfortunately, it is only a small minority who are of this type from the start, but a considerable number learn to adjust themselves after the first few months of treatment.

There are many points of similarity between the tubercle and the war neuroses. Underlying both is the fear of death and the resulting conditions must be looked on as the reactions of individuals of varying mental make-up to this all-pervading emotion. The specialised form of slangy speech with which the soldier attempted to keep away his fears, is closely comparable to that of the tuberculosis patient who must refer to a refill as a "blow-up" and the replacement of an oleothorax as "emptying the sump."

Anxiety.—Many patients are obviously apprehensive throughout the disease; unduly meticulous in the conduct of their cure, they may record their temperatures almost hourly and regulate their lives with stop-watch precision. Trivial symptoms are treated with great seriousness and the self-centred condition, produced by the constant preoccupation with routine, results in the treatment of the disease

becoming a career in itself. Treatment of this condition is difficult, as the patient has usually been of an apprehensive nature since early childhood. Confiscation of the thermometer and an attempt to remove some of the more obvious fears by persuasion may help, but a change in the patients circumstances which forces him to be more dependent on his own efforts and resources may be more successful. H. Banister[2] has rightly emphasised the fact that the unduly ego-centric make poor patients as it is these who may become the valetudinarian "old-lags" known to every sanatorium. This concentration on self interferes with sleep and prevents the patient from getting that mental and physical rest which is so essential for recovery.

Over-compensation.—Among the defence mechanisms produced by fear of consumption none is more far-reaching in its consequences than over-compensation. The presence of so serious and dangerous a disease is inacceptable to the mind of the patient, and, not content with the mere repression of the idea, he sets himself an impossibly high standard of physical prowess, as a result of which he may commit acts of bravado, such as drinking to excess, in order to demonstrate to himself and others how far removed he is from the lethargic milk-drinking consumptive. The tell-tale thermometer is ignored, and by recording a false reading the patient sets out to deceive the physician he is paying to aid his recovery. Many lives are lost through the operation of this mechanism. Although for disciplinary reasons some of these patients cannot be kept in an institution, the sanatorium physician has no cause to pride himself on "always kicking out fellows who play the fool," for each one of these represents a failure of treatment. Over-compensation is more amenable to treatment than the anxiety state previously described, and in most cases it is not difficult to give the patient insight into his mental condition, after which the need for over-compensation disappears. It is a more difficult matter however, to diagnose this mechanism as deception of the physician is part of the process.

Regression from and a failure to face reality is another common phenomenon. In the early stages of treatment few patients will admit to themselves that they have any doubt as to the favourable outcome of the disease, although as time goes on some will state that all the time they have had an underlying fear that they might never recover which is in sharp contrast with their conscious belief that they will be able to lead perfectly normal lives after a few weeks or months of treatment. Similar reactions are brought into play when a patient who has had ample opportunities of studying the disease in others starts a relapse. The symptoms that should give him clear warning are put down to trivial causes, loss of weight to errors of diet, fever to a chill, the return of sputum to a cold on the chest, and even a hæmoptysis to bleeding from the throat or nose. If asked point blank if he did not know quite well that such symptoms indicated a return of the old trouble the patient may shrug his shoulders and say that he supposes he knew underneath, but that he was so anxious not to be ill again that he did not let himself think about it.

Spes phthisica.—With unfavourable progress, this underlying fear may reach such dimensions that the flight from reality, necessary to prevent it from forcing itself into consciousness, reaches the extreme form known as spes phthisica. This condition is similar in many ways to the mental state in early general paralysis, in which fear of the dreaded disease may drive the patient to the opposite extreme of arrogance and bombastic behaviour. It is difficult to know to what extent the phthisical patient succeeds in deluding himself; sometimes he seems to be fairly successful, but in other cases it is no more than a pitiful attempt at self-deception. The patient is

> Like one that on a lonesome road
> Doth walk in fear and dread
> And having once turned round, walks on,
> And turns no more his head;
> Because he knows a frightful fiend,
> Doth close behind him tread.

Projection is another phenomenon which is commonly observed in the tuberculous patient; it appears in the form of a morbid interest in other people's disease. The majority of sanatorium patients think nearly all the others are worse than themselves, and not a few derive consolation from the worse plight of the more severe case. Such a patient puts the blame, if he fails to improve, on doctors, climate, food, in fact on anything but himself.

The rebel type.—When a person of this type of mentality gets tuberculosis he makes a difficult problem for the physician, as the attitude he adopts against authority makes him regard any unorthodox remedy as necessarily more efficacious than the methods of treatment generally accepted by the medical profession. It is among these unfortunates that the "persecuted" quack has his most happy hunting ground. A frank admission of the smallness of our knowledge and the magnitude of our ignorance may help to gain the confidence of such a patient; at worst it will rob him of his favourite theme that all doctors are humbugs who claim omniscience.

Hysterical conversion.—In addition to the forms of mental reaction to tubercle already discussed, which are present in some degree in the majority of patients, wider variations from the normal are sometimes met with; amongst these the conversion of the unacceptable fear into hysterical symptoms is the most important. In one case attacks of tachycardia associated with severe dyspnœa were found to be due to repression of the fear that on account of his tubercle the patient would be unable to return to his work at the end of three months; at all events the attacks suddenly ceased when the patient was made to realise that he must face the facts of his condition and build more hopes on the distant than on the near future. The complete psycho-analysis of the Freudian, although unrivalled for the scientific study of the unconscious, is not practicable in the majority of cases of tubercle, and is probably undesirable in more than a very small proportion, as symptoms of neurosis must be very severe to justify the risk of aggravating the tubercle by the strain of the analysis.

HOME AND SANATORIUM ENVIRONMENT.

This discussion of the mental aspects of tubercle would not be complete without some reference to the difference between the home and the sanatorium atmosphere. The disadvantage of the former is that the patient is constantly reminded of his physical inferiority by being surrounded by healthy and solicitous relatives. The anxiety of his family may suggest to him that he is worse than is actually the case; on the other hand it may drive him to prove by over-compensation that he is really quite well. Many patients, who require strict rest, find it impossible to allow themselves to be waited on by elderly or more physically feeble relatives. Although the sanatorium provides a more healthy atmosphere in these respects, it is common to find patients who do not easily adapt themselves to an institutional

[2] THE LANCET, 1930, i., 784.

atmosphere; although most of these settle down in a few days or weeks there are a few who cannot do so. It is interesting to note in this connexion that a recent example of this form of claustrophobia admitted that he had twice run away from school.

THE NEO-HIPPOCRATIC OUTLOOK.

The recent great advance in biochemical and physical knowledge has focused attention on that approach to the problems of disease by which all vital activity will ultimately be reduced to the interaction of various groups of atoms and electrons. Great as has been the gain of medical science and philosophy from this work, it has brought with it the danger that the reactions of the organism as a whole may be overlooked. Of all morbid conditions, tuberculosis is the one in which it is most essential to treat the patient rather than the disease. Specific remedies, although useful in many cases, are no more than adjuvants to general hygienic treatment aimed at "raising the resistance." In this struggle between health and disease the mind plays an important part, and I believe that further understanding of the mechanism by which the mind responds to the stimulus of the disease would enable more rational and effective treatment to be applied.

VACCINE TREATMENT IN INFECTIVE ARTHRITIS.

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OPINION on vaccine therapy in rheumatic diseases has for some time been in a state of flux. The theory of focal infection as an ætiological factor held out a promise from this form of treatment which few will now admit to have been entirely fulfilled. Nevertheless, there is a fairly substantial opinion that vaccine treatment is not without its value, and it seems therefore that a critical survey of a recent series may be of interest.

The literature of vaccine therapy in rheumatic diseases is in a most unsatisfactory condition, although reports of "good results" are not lacking. In many cases the numbers are inadequate, in others the diagnosis is vague or the number of unsuccessful cases is not stated, and the figures have rarely been considered with a view to determining how far any differences may be due to the factor of chance. The only way in which anything approaching proof can be obtained is to compare, in as many ways as possible, the results of treatment in two large series, in which the conditions are as much the same as may be.

It is desirable: (1) that the inquiry should be confined to one clinical entity; (2) that a control series of adequate size should be provided; (3) that every attempt should be made to minimise the personal factor; (4) that the intermittent character of the symptoms should be taken into account; and (5) that the factor of chance variation should be allowed for.

It must be admitted that only certain of these desiderata have been attainable. The inquiry has easily been limited to cases of infective arthritis only, and differences less than those possibly due to chance variation have been disregarded. The provision of a suitable control series has, however, been more difficult. The ideal method would of course have been to withhold all other forms of treatment from half the patients and to treat the other half with vaccines. This, particularly on the large scale that would be necessary, is impossible. I have had, therefore, to be content with comparing two series both treated in various ways, in one of which vaccines have been given. The series themselves are not identical, but where they differ an attempt has been made to allow for the difference. The fact that natural variations of symptoms tend to occur has been partly dealt with by a consideration of the progress on returning home, and a comparison of this with the clinical condition of the patient on admission. Great care was taken that all cases should be typical, and as there was no shortage of material, all doubtful cases were excluded.

The following criteria were used in the selection of cases: (1) That the affection should have been more or less continuous since its onset. (2) That it should be polyarticular. (3) That at least one small joint should be affected. (4) That the radiological and laboratory findings, where present, should be in agreement with the clinical diagnosis.

TECHNIQUE OF VACCINE THERAPY.

The stock vaccine was freshly prepared each year from about forty strains of *Streptococcus viridans*, isolated from the teeth or tonsils of patients suffering from infective arthritis. The autogenous vaccines were usually prepared from the same sources but occasionally from other suspected foci.

The organisms were grown in 1 per cent. glucose nutrient broth (pH 7·5) and produced a fairly abundant growth in 24–48 hours. They were then centrifuged and re-suspended in 0·5 per cent. phenol in normal saline. Killing was effected by heating in the water-bath for 45 minutes at 56° C., and standardisation by comparison with a tube containing a 0·5 per cent. suspension of barium sulphate in water. Sterility tests were made, and were left up for at least three days before the vaccine was considered ready for use.

The vaccines were given subcutaneously just under the clavicle, at intervals usually of three or four days, but sometimes weekly. The reaction was always allowed to subside completely before giving another dose. The initial dose was as a rule in the neighbourhood of 5–10 million. The number of doses given to each patient was seldom more than twelve, and the average was eight. The patients in this, as in the non-vaccine treated group, received in addition balneological and other forms of physical treatment during their stay in hospital.

THE INQUIRY.

At the beginning of last year (1930) each patient who had received treatment in the period January, 1928, to December, 1929, was requested to fill up and return to the hospital a post-card stating whether his condition had (1) improved, (2) remained the same, or (3) got worse, since returning home. No post-card was sent to a patient who had not been at home for at least three months. The majority had been at home for very much longer, in fact for periods varying up to nearly two years. About 80 per cent. of the cards were returned, and it was thus possible to get some idea of the late results of treatment, at least from a subjective point of view.

It is well, in making a comparison of this description, to examine both series minutely with a view to determining how nearly they are alike in every particular except the essential one. As has been mentioned, both groups of cases were treated in the years 1928 and 1929, both received general treatment, and in both the sex distribution was roughly about the same.

The *average age*, however, was definitely higher in the non-vaccine treated group, well over one-third of the cases being over 50 years of age, whereas in the other series this was the smallest group of all. It was therefore thought advisable to consider the

question of age in relation to improvement in both instances. The cases were for this purpose divided into four groups: (1) Up to 29 years, (2) 30 to 39 years, (3) 40 to 49 years, and (4) over 50 years. These groups were then considered as to whether they showed great improvement, improvement, slight improvement; no improvement, or deterioration. Taking into account the smallness of the figures when so subdivided, no significant difference appears in the various age-groups of either series. One therefore came to the conclusion that age differences between the two groups could justifiably be disregarded.

The duration of the disease was then considered. The cases in both series were divided into three groups as follows: (1) those with a history of under one year; (2) those with a history of from one to five years; (3) those with a history of over five years. They were classified in the same manner as the age groups. In both series a slight drop in improvement was noted as the time since the onset of the disease lengthened. This is a factor which has a bearing on the comparison, as there were 50 per cent. of patients with a history of over five years in the non-vaccine treated and only 15 per cent. in the other group.

The *condition on admission* was considered thirdly, and here again it is obvious that the series are not altogether alike. Unfortunately this particular was only available in a proportion of the cases, so allowance has had to be made for the size of the figures. The results of this part of the inquiry are summarised in Table III., which shows that 48 per cent. of the vaccine treated cases were showing some degree of improvement on admission, whereas in the non-vaccine treated the corresponding figure was only 33 per cent.

TABLE I.—VACCINE-TREATED CASES.

CONDITION ON DISCHARGE.

The following symbols have been used throughout: + + Great improvement, + Improvement, ± Slight improvement, O No improvement, — Worse.

	+ +	+	±	O	—	Total.	Total improved.
	106	159	40	25	1	331	305
Per cent.	32	48	12	8	—	100	92

Table I. shows the condition of the 330 vaccine-treated cases on discharge. It is seen that 92 per cent. have made improvement of some degree or another. It is not intended to draw any conclusions from figures such as these, which may be so very greatly influenced by personal opinion, but they are included to furnish a possible comparison with the results of other workers.

Table II.A shows the summary of the replies to the post-cards, and must be taken simply for what it is worth. It represents solely the patients' opinion of the progress made or of the course of the disease. Inasmuch as other information, such as return to work and so on, was often volunteered, it is not without value, and is, in the circumstances, the only evidence of the sort that can be obtained. The degree of improvement was not asked for, but was given in a number of cases.

The list of patients that did not reply was examined, and it was found that the proportion that had improved, remained stationary, or got worse while in hospital was about the same as in the list which replied. It therefore seemed probable that the series under consideration represented a fair sample, and that its selection was not influenced by other factors than chance.

Table II.B shows the subsequent improvement in the 550 non-vaccine treated cases, the total admitting any degree of improvement being 43 per cent.

TABLE II.—SUBSEQUENT CONDITION.

A.—VACCINE TREATED.

	+ +	+	±	O	—	Total.	Total improved.
	51	76	39	58	49	273	166
Per cent.	19	28	14	21	18	100	61

B.—NON-VACCINE TREATED.

	+ +	+	±	O	—	Total.	Total improved.
	27	143	64	175	141	550	234
Per cent.	5	26	12	32	25	100	43

TABLE III.—CONDITION OF PATIENTS ON ADMISSION.

A.—VACCINE TREATED.

	+	±	O	—	Total.	Total improving.
	81	8	34	65	188	89
Per cent.	43	5	18	34	100	48

B.—NON-VACCINE TREATED.

	+	±	O	—	Total.	Total improving.
	57	9	31	104	210	66
Per cent.	28	5	16	51	100	33

COMMENT ON THE DATA.

A comparison of these tables (II.A and II.B) shows that 61 per cent. of the vaccine-treated cases have made some degree of improvement, whereas in the non-vaccine treated group the total is only 43 per cent., a possible difference of 18 per cent. in favour of vaccine treatment.

If, however, this is considered with the figures showing the condition on admission (Table III.), it is seen that the difference is more apparent than real. As has been mentioned, 48 per cent. of the vaccine-treated patients stated that they were improving before admission, so that the absolute total improved was 61 per cent.—48 per cent. = 13 per cent. In the non-vaccine treated 33 per cent. stated that they were improving before admission, so that in this case the absolute total was 43 per cent.—33 per cent. = 10 per cent.

The real difference between the two series therefore seems to be represented by 13 per cent.—10 per cent. = 3 per cent.—a difference which is not significant when taking into account the size of the figures. Even if there were a slight significant difference it is probable that it would be accounted for by the fact that the vaccine-treated cases had on the average a much shorter history. It is considered that the figures in Tables II. and III. are strictly comparable,

as both the statement as to condition on admission and the reply to the post-card represent the patient's point of view.

It is, of course, a fallacy that the post-cards were all sent out at the same time—that is, at greatly varying intervals after discharge, but as this was the same in both series the comparison still holds good. It was noted that there was no evidence of greater benefit in 92 patients who received autogenous vaccines than in the vaccine-treated group as a whole.

The conclusion is therefore that, within the limits of the inquiry, vaccines do not appear to hold out any better prospect of improvement or cure of infective arthritis than the other methods of treatment in use.

MULTIPLE MALIGNANT GROWTHS OF THE BUCCAL CAVITY.

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Lord Moynihan's clinical note on a Case of Primary Carcinoma developing, at intervals, in three different parts of the buccal cavity (The Lancet, Jan. 2nd) and his statement that he has "never before seen two primary malignant growths in the mouth" prompts me to report the following case.

On March 16th, 1931, a man, aged 62, was admitted into the David Lewis Northern Hospital, Liverpool. He complained that for three months he had been troubled by "soreness of his gums" on the left side. His mouth was edentulous and on the left side there was an epitheliomatous ulcer involving the floor of the mouth and the alveolus. The epithelioma was some two and a half inches long and extended back on to the fauces. The tongue could only be protruded half an inch beyond the gums and deviated to the left. The Wassermann reaction was negative. No involvement of the glands could be detected.

The growth was treated with surface application of radium on a plaque and when he was seen a month later the mouth seemed to be normal, the ulcer had healed up, and the induration of the floor of the mouth had gone. In July, however, he returned, complaining of severe pain in his left ear. On examination marked induration and thickening was found posteriorly in the angle between the tongue, the mandible, and the fauces. Radium was again applied. He returned for examination at intervals and appeared to be progressing well. The induration and the earache disappeared.

On Nov. 26th he came up for routine re-examination. He said he had come for his discharge as he had no pain and was sure he was cured. When I asked to see his mouth he protruded his tongue fully one and a half inches and deviated it well over to the right side so that I could examine the left side of his mouth. There was no sign of any recurrence of malignant disease on the left side. No glandular enlargement could be felt on the left side but, to my surprise, I found a hard mass of glands in the right submaxillary region and on the floor of the mouth, on the right side anteriorly, just under the tongue was the cause of this—a small indurated and ulcerated plaque, one centimetre in diameter. This plaque presented all the characteristics of an epithelioma. The patient was quite unconscious and even incredulous of this new development and at first refused to undergo further treatment. Later he consented to come into hospital and radium needles were inserted into the epithelioma and into the cervical glands.

In The Lancet of Oct. 26th, 1929, p. 873, I reported a case of Implantation of Epithelioma in the Alveoli of the Maxilla from primary growth in tongue which show similar features to Lord Moynihan's case. The main features of this case were as follows:—

A man aged 50 years. A very large epitheliomatous ulcer on right side of the tongue extending back on to right palato-glossal fold was excised with diathermy two weeks after the first and second right upper molars had been extracted. Ten weeks later he returned for re-examination and it was found that, though the tongue had completely healed and there was no sign of a local recurrence, three new and discrete growths had appeared. On the left tonsil there was an epitheliomatous ulcer, half an inch in diameter, which spread on to the soft palate but did not involve the tongue or the anterior pillar of the fauces. The sockets of the extracted molars were filled with fungating masses of epithelioma which though contiguous were quite distinct from one another. All of these growths were excised with diathermy cautery. When the man died three months later, there was no sign of any recurrence in the mouth.

OTHER REPORTED CASES.

Spencer and Cade[1] report five similar examples:

(1) Male, aged 71. Four separate growths on the palate.
(2) Male, aged 53. A patient of Butlin who had four discrete epitheliomas on the border and under surface of the tongue and floor of the mouth as well as a rodent ulcer at the inner canthus of the eye.
(3) Female, aged 74. A papillary epithelioma on the left margin of the tongue, followed three months later by an epitheliomatous ulcer on the right lateral margin.
(4) Male, aged 57. Epithelioma involving the right lateral margin of the tongue and adjoining portion of the floor of the mouth and alveolus, followed three months later by an epithelioma developing on the soft palate.
(5) Male, aged 62. A papillary carcinoma on the left lateral margin of the tongue and an epitheliomatous ulcer on the right palato-glossal fold.

Fraser[2] in an investigation of 105 cases of buccal carcinoma found five cases of multiple primary growths. In one of these, however, the first growth to appear was a rodent ulcer of the left nostril. The other four cases were as follows: (1) Epithelioma of lower lip followed 14 years later by an epithelioma on the right palato-glossal fold. (2) Epithelioma of lower lip followed 14 years later by an epithelioma on the left palato-glossal fold. (3) Epithelioma of lower lip followed seven months later by an epithelioma on buccal surface of right cheek. (4) Epithelioma of left lateral margin of tongue followed eight years later by an epithelioma on the right lateral margin.

L. T. Owen[3] in a review of 3000 cases of malignant tumours found only two examples of multiple intra-buccal growths—namely, (1) epithelioma of floor of mouth apparently cured but followed seven years later by an epithelioma on the alveolus; (2) an epithelioma on the right margin of the tongue followed three years later by an epithelioma on the left border.

PRIMARY OR SECONDARY?

These examples seem to suggest that cases such as Lord Moynihan's, though uncommon, occur more frequently than is generally supposed.

Are the lesions multiple primary tumours or are they produced by metastasis or implantation? Billroth[4] emphasised the importance of the criteria used as a basis for diagnosis and established these postulates which he felt were necessary for the diagnosis of multiple malignant neoplasms:—

(1) Each tumour must have an independent histologic appearance. (2) The tumours must arise in different situations. (3) Each tumour must produce its own metastasis.

Mercanton[5] suggested the addition of a fourth postulate—namely, no recurrence of the tumours after their removal.

It seems to be as unreasonable to demand the fulfillment of the third and fourth postulates in the diagnosis of multiple primary carcinomata as it would be in the diagnosis of a single carcinoma, and insistence on Billroth's first postulate would put out of court all the cases that I have quoted.

We may consider that Billroth's criteria are unnecessarily stringent, but in view of the general and well-founded clinical conception of cancer as a condition arising from a single focus of origin but acquiring multiple secondary foci of development, the burden

of proof is, indeed, upon one who assumes a case to illustrate multiplicity of primary malignant tumours, and there are so many possibilities of error in observation and interpretation that one should approach the subject with extreme reserve, and that only after carefully considering the possibility of metastasis or implantation.

It is highly improbable that cases of multiple intrabuccal carcinomata can be explained away as examples of metastasis, for though epithelioma of the tongue shows an almost constant invasion of the lymphatic glands, secondary deposits elsewhere are extremely rare. Moreover, if these multiple tumours were the result of metastasis, we should expect to find secondary growths in other parts of the body as well.

Over 250 years ago, with only the knowledge and narrow views of his day, Tulpius, the Dutch anatomist, one of the principal figures in Rembrandt's masterpiece, "The Anatomist," said: "Cancer is just as contagious as inflammation of the eyes." Doubtless this is an exaggerated statement, but there has accumulated much clinical and experimental proof that cancer is occasionally communicated from host to host or from one part of the body to another. Among the most striking examples are those showing the spread of cancer of one side of the vulva to the other. Von Bergmann[6] recorded a case of a man with a cancer of the lower lip and exactly opposite to it on the upper lip was a similar growth, and Macewen[7] tells of a man with an epitheliomatous ulcer of his lip who had contracted the habit of rubbing the ulcer and then the tip of his nose with the same finger. Twenty months after the removal of the growth on the lip, he returned with a large ulcer on the tip of the nose identical microscopically with the original tumour. Shimmelbusch[8] reported a similar case of apparent cancerous infection of the lip through the finger-nails of a person with an epithelioma of his ear.

There appears to be no doubt that implantation carcinoma of the mucosa of the alimentary canal has occurred on many occasions and that traumatised tissues are an especially fertile bed for this development. Hoche[9] has reported an epithelioma arising in the centre of a gastric ulcer in a patient with carcinoma of the œsophagus, and Dowden,[10] Challier,[11] among others, have described cases of implantation arising in colostomies from carcinoma of the large bowel. The development of carcinoma in the tooth-sockets in the case I have reported would seem without doubt to be another example of auto-inoculation or implantation and it would be illogical to invoke a different explanation of the origin of the carcinoma on the left tonsil in the same case. Probably many of the other cases of so-called multiple primary carcinomata of the buccal cavity are in reality examples of cancerous implantation.

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CLINICAL AND LABORATORY NOTES

A CASE OF ENTERO-MESENTERIC CYST

SIMULATING ACUTE RETENTION OF URINE.

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ENTERO-MESENTERIC cysts often give the symptoms and signs of various acute abdominal conditions such as acute appendicitis, intussusception, volvulus, or intestinal obstruction, but we cannot find any record of it simulating a case of acute retention of urine. The failure to pass urine, together with the presence of a swelling in the abdomen having the shape and consistency of a large palpable bladder but which at operation was found to be an intraperitoneal cyst, render this case an unusually interesting one.

REPORT OF CASE.

Past history.—The mother stated that the boy had always been a delicate child and had often complained of tenderness in the lower part of the abdomen, with vague abdominal symptoms. He had an attack of "catarrhal jaundice" when aged 6, and 18 months ago was in bed for several months with acute rheumatism. He was also admitted to hospital in February, 1929, with a provisional diagnosis of intestinal obstruction. The hospital notes of that time state that he had a history of continual vomiting of green fluid for a week with constipation. He appeared very ill, had a sunken look on admission, with sordes on his lips. On examination of the abdomen no peristalsis was observed, it was doughy to palpation, no tumour was felt, but free fluid was present. Paracentesis abdominis was performed and a straw-coloured fluid withdrawn. The pathological report stated that no tubercle bacilli were detected, cells were present, mainly small lymphocytes and endothelial cells. The culture was sterile. The constipation was treated, condition subsided, and patient was sent to a convalescent home some weeks later with a final diagnosis of tuberculous peritonitis. An interesting point bearing on his subsequent history was the fact that during his stay in hospital the patient had considerable difficulty in passing urine, and his foreskin was slit in an attempt to remedy this.

History of present attack.—The patient, now aged 8, was admitted to hospital on June 6th, 1931, with the diagnosis of acute retention of urine. A day before admission the boy returned from school in a collapsed state, was giddy, faint, and complained of pains in his abdomen. He was given an aperient and bowels were freely opened. He did not micturate that day, was very parched, drank freely, and was very restless during the night owing to the abdominal pain. He vomited that night and twice in the morning. On admission to hospital the patient was pale, thin, dull, and toxic, with a coated dry tongue. Temperature, 100·4° F.; pulse-rate, 100; respiration, 22. The abdomen was rigid, and a hard tender swelling was palpated in the mid-line reaching to half an inch below the umbilicus. There was free fluid in the flanks. The respiratory and central nervous systems were normal. A rubber catheter was passed without difficulty but no more than 4 ounces of urine was collected. Later another catheter was passed, but this time no urine came through. A catheter was passed under general anæsthesia in the theatre, but again no urine was withdrawn.

Operation.—A right paramedian incision was made. On opening the peritoneum free yellow fluid was found, and a large, fairly thin-walled intraperitoneal cyst was exposed. The cyst was the size and shape of a large coco-nut, was smooth, and had a pale greenish appearance. It was continuous with, and attached to the mesentery of the small intestine, near its fixation to the posterior abdominal wall, and was fairly mobile on its attachment. The attachment was broad with myxomatous appearance, and the small gut in one portion (about 1½ inches) was attached to it. The cyst was aspirated and some yellow fluid evacuated. It was then incised, and yellow jelly-like material was expressed. The inner lining of the cyst was very red and œdematous.

The interior of the cyst did not appear to show any communication with the intestine, and it had no relation to the urachus. The cyst was excised near its attachment, and separated with great difficulty from the small gut. The raw edges were covered with omentum. The bladder was normal.

A drainage-tube was inserted in the pelvis. The peritoneum covering the gut showed some inflammation. Rectal salines and glucose six-hourly were given after the operation. The patient was restless with a rapid pulse, vomited on several occasions, and no urine was passed. The next day 6 oz. of urine was passed, but there was some distension of the abdomen. He vomited several times for some days and the urine was small in quantity. After the operation the urine contained acetone for five days and was alkaline, but contained no albumin or pus. No organisms were found. The urine then became acid in reaction, with only a trace of acetone for four more days. The quantity passed gradually increased daily, till three weeks after the operation about 30 oz. were passed daily. The acidosis was counteracted by glucose and sodium bicarbonate. The child made an uninterrupted recovery. The blood-urea after the operation was 54·0 mg. per 100 c.cm. The blood-urea taken a month after the child was discharged from hospital was 16·3 mg. per 100 c.cm.

Pathological report of a section of the cyst (see Figures) stated "chronic inflammation and œdema of cyst, containing unstriped muscle in its wall. There is no lining to the cyst. The wall shows some intramural cystic change of colloid type." The fluid in the cyst, macroscopically and microscopically, had a similar appearance to that of Wharton's jelly, showing cells with elongated processes in a gelatinous fluid.

ÆTIOLOGY OF THE CYSTS.

The origin of these intraperitoneal cysts has given rise to much discussion. Bland-Sutton [1] states that "the human body contains certain tubes which, so far as is known, serve no useful purpose in the adult, and may be called in consequence functionless ducts," and among these he includes the vitello-intestinal

FIG. 1.

Section of cyst wall.

duct. This is of interest to pathologists since it is the source of cysts which may be dangerous to life. Cysts of the vitello-intestinal duct occur at the umbilicus, or as a Meckel's diverticulum, or rarely this cyst may have no communication with the bowel and its umbilical end occluded, but the intermediate portion is distended (Eisendrath [2]). Cysts identical with the structure of the gut but yet having no communication with the gut have been described on a number of occasions, such as by Hunter,[3] Eve,[4] and Shallow.[5] In describing his cyst Hunter states, "the present specimen is of interest in connexion with the ætiology of the mesenteric cyst because its wall contains all the elements found in the wall of the intestine; and yet as a careful dissection showed, no communication existed at the time of examination with the intestine." In the cyst described by Hunter, as in that described by us, there was no epithelial

FIG. 2.

Another section of the cyst wall.

lining, "but that fact does not necessarily mean that the epithelium has never been present there. It may have disappeared under pressure or under the long-continued inflammatory process" (report of Prof. Walsh on Hunter's cyst). Edwards,[6] in discussing the origin of the cyst, states: "Gfeller [7] regards the cysts as arising in connexion with an unobliterated omphalo-mesenteric duct either by separation of a part of the intestinal 'Anlage' or by germinal displacement. This is unquestionably the most likely hypothesis, and it would appear that the cyst-like diverticula referred to are formed from intestinal cysts by the acquisition of a secondary communication with the lumen of the bowel." Evans,[8] in an exhaustive review of the literature of enterogenous cysts, says: "There can be no doubt that cysts whose walls reproduce completely or incompletely the structure of gut, whether discovered in the wall of the gut, attached to the gut, or even more or less remote from the gut, must have been derived from the gut. They are developmental enterogenous cysts. . . . These cysts originated either in the vitello-intestinal tract or in the diverticula which are found in the developing entoderm of the embryo as described by Keibel and by Lewis and Thyng." [9]

The curious feature in the case we have described is the almost complete suppression of urine during the acute inflammatory attack in the cyst. A similar condition occurred when the child was admitted to hospital in 1929 with "intestinal obstruction" (we presume an inflammatory attack in the cyst was the cause of his illness at the time), and, the condition being unrecognised, slitting of the foreskin was adopted to relieve the urinary symptoms. When the inflammation subsided, his urinary secretion became normal. The mother says that between the attacks the child had no trouble with micturition and that his urinary output was normal. At the operation there

did not appear to be any mechanical reason, such as pressure on the kidneys or ureters, to account for this. One of us (H. J. S.) consulted Sir Arthur Keith about this combination of suppression of urine and the presence of an entero-mesenteric cyst. He stated that he knew of no case in which the inflammation of the cyst was accompanied by suppression of urine, and he could not see any physiological reason why this should occur.

We are indebted to Dr. R. Kelson Ford, medical superintendent of St. Olave's Hospital, for permission to publish this case.

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A CASE OF MENINGITIS CAUSED BY BACILLUS PARATYPHOSUS B.

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A child was brought to hospital at the age of 5 weeks. He had been in good health for first three weeks of life, but after that did not take feeds well and had severe vomiting after them. He refused the breast, and was put on various patent foods. The bowels were loose and the motions watery and green, and there was an indefinite history of rash over the trunk when 14 days old. He began to have a severe cough just before admission. There had been no recent illness in the house. The case was seen by a doctor outside and sent into hospital with the diagnosis of pneumonia.

On admission the child was found to be thin and poorly nourished. There was a considerable degree of generalised bronchitis, but no consolidation of lung. Stools were loose, green, and foul. Temperature, 102·6° F.; pulse-rate, 148; respirations, 48. The case presented the appearance of a very severe enteritis until five days after admission, when definite meningeal signs developed and lumbar puncture was performed. 20 c.cm. of purulent fluid was withdrawn, and, assuming the infection to be meningococcal, 15 c.cm. antimeningococcal serum was injected intrathecally. The child died 12 hours later.

Causal organism.—On examination of a smear of the pus, it was found that the organisms present were pleomorphic Gram-negative bacilli, mainly of a cocco-bacillary type. The exudate consisted almost entirely of polymorphonuclear cells. Cultures made on agar and blood-agar resulted in luxuriant growths on both slopes. Subculture on an agar plate showed that the organism was present in pure culture. An emulsion of the organism was made and injected into a mouse and a guinea-pig. Both animals died, and pure cultures were obtained from the peritoneal exudate and the heart blood. Fermentation tests with carbohydrates, growth in litmus-milk and formation of indol, showed that the organism belonged to the salmonella group of bacilli. Serological tests with immune sera proved that the organism was *Bacillus paratyphosus* B, Schottmüller.

At *post-mortem examination* the appearance of the brain was as follows. The meninges showed very considerable congestion, and the surface of the brain appeared bright red. The inflammation was generalised and extended up to the vertex, the sulci on the top of the brain containing pus. There was much thick yellowish pus at the base of the brain. Pure cultures of the organism were obtained. Histological sections of tissue from the vertex and base of the brain showed an acute meningitis with a polymorphonuclear exudate and abundant Gram-negative bacilli.

An attempt was made to find out the source of the infection and, to this end, the blood of the parents was examined. The mother's blood gave a positive agglutination in high dilution against stock *B. paratyphosus* B, and also against the child's organism, although no history of illness on her part could be elicited, and examination of the fæces and urine on two occasions was negative. The father's blood, fæces, and urine were also examined but gave negative results. There were no other members of the household.

Meningitis due to *B. paratyphosus* B appears to be very uncommon. M. B. Brahdy,[1] describing a case of his own, collected a series of six cases from the literature, in which serological investigations had been performed. He claims that his is the first case to be described in the English language.

The age of the child (5 weeks) is also of interest. The fact of its removal from the breast and the substitution of patent foods rendered extraneous infection a possibility, but the marked agglutination given by the mother's blood (in the absence of previous inoculation) showed that she had had a paratyphoid infection and had probably infected the child.

In conclusion, I wish to thank Dr. W. M. Elliott, superintendent, Ruchill Fever Hospital; Dr. Robert Cruickshank, bacteriologist to the Glasgow Royal Infirmary; and Dr. W. R. Wiseman, city bacteriologist, who performed the serological investigation, for their advice and help.

PYOPNEUMOTHORAX IN HODGKIN'S DISEASE.

REPORT OF A CASE.

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The following is an instance of Hodgkin's disease being not only overlooked, but actually unsuspected during life, even after careful clinical investigation with the assistance of the usual aids to diagnosis.

Not only were there no palpable enlarged glands anywhere, no enlargement of the spleen, and no other symptoms typical of Hodgkin's disease, but what added to the difficulty was the presence of a dominating pyopneumothorax with streptococcal infection.

CLINICAL RECORD.

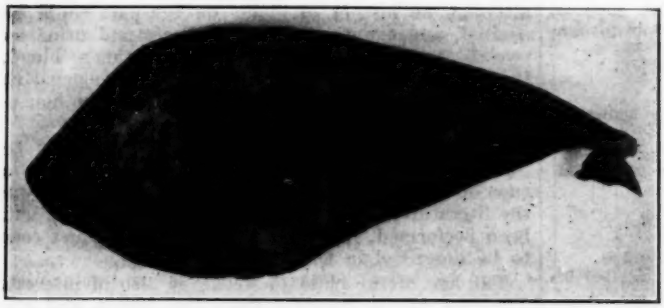
History.—A single woman, aged 23, was admitted to the Sheffield Royal Hospital on May 25th, 1931, with a somewhat vague history. Apparently she was in her ordinary health until the latter half of January, 1931, when she complained of pain in the lower part of the back, and of great weakness. She went to bed for a week and then returned to work, but still felt very ill. However, 12 weeks before admission she became feverish, the pain continued, and she was in bed for six weeks. She states that her temperature was raised

[1] Arch. of Ped., 1925, xlii., 550.

all this time. She was then up and about again but still feeling very ill.

Two weeks before admission the weakness became worse and she developed a cough and sore-throat. She also complained of a stabbing pain in the right side, which was made worse by coughing or taking a deep breath; it was so severe that it made her "scream out." Her breathing has also been "heavy." This stabbing pain lasted for about a week.

FIG. 1.



Photograph to show the tumour-like mass in the liver.

On May 18th a needle had been put into the right chest but no fluid was obtained.

The personal and family history gave no information of importance. Her general functions are normal except that the menses ceased in January, 1931, for the first time. They had always been regular before.

Examination (May 25th).—A small spare woman propped up in bed. Respiration-rate 40, with obvious distress; temperature, 102° F.; pulse-rate, 152. Full examination showed no abnormal signs in the nervous system, no superficial glandular enlargement, no changes in the limbs. Nothing abnormal to be seen or felt in the abdomen; the spleen was not palpable. The abnormal conditions were apparently quite limited to the thorax. The heart was in its normal position; no murmurs were present. Chest expansion was much diminished. The chest was poorly developed. Rhonchi were heard here and there over both lungs. Movement was diminished on the right side, and at the right base there was complete dullness with absence of breath sounds. No tubercle bacilli were found in the sputa.

Course of Illness.—During the next few days she remained much the same, the temperature ranging each day from normal to 102° F. The respirations came down to 28, and the pulse-rate varied from 120 to 130. There was a trace of albumin in the urine. She complained of more pain in the right chest, cough, and shortness of breath.

Radiography on May 30th showed restricted movement of the right diaphragm. The heart small; normal in position. Partial collapse of the right lung, and an area of pneumothorax occupying the costophrenic angle. Marked fibrosis extending from the right hilum towards the base. This was evidently the beginning of the pneumothorax, for when the patient was last examined there had been no signs of it.

During the next few days her condition became worse—the temperature began to swing more, the pneumothorax increased rapidly, and signs of some fluid appeared at the right base. The mediastinum and heart were displaced to the left. On June 5th a second radiogram confirmed these findings. On June 6th the chest was punctured by the medical registrar, Dr. T. E. Gumpert. It was found that there was a negative pressure −2 to −6: 270 c.cm. of air was injected to restore a pressure of zero (−3 : +3).

A blood count on June 3rd showed: red cells, 3,700,000; hæmoglobin, 35 per cent.; white cells, 14,400; platelets, 250,000. Of the leucocytes 95 per cent. were polymorphs, with many young forms. No eosinophils seen.

On June 11th, 270 c.cm. of streptococcal pus were removed. Again the pressure before doing this was −2 : −8: and was afterwards brought to zero (−2+2) by replacement of 250 c.cm. of air. After this her condition improved somewhat. Blood cultures were negative. Repeated examinations showed no change in the physical signs. There was a large pneumothorax on the right side with a small quantity of movable dullness at the base. The temperature remained about the same as before. The liver edge was about two inches below the costal margin; it was smooth and apparently normal. The spleen was not palpable. There were no abnormal physical signs in other parts. No petechiæ. No cardiac murmurs.

On July 6th she vomited after taking her morning dose of medicine and complained during the day of loss of appetite. Later in the day she began suddenly with acute pain in the abdomen. On examination the abdomen was distended, rigid, and very tender—more on the right side than the left. It was evident that she had acute peritonitis, and after consultation with Prof. Graham Simpson, it was decided that with the pulmonary condition present, operative interference did not offer any likelihood of benefit. She died on July 9th and autopsy was performed on the following day.

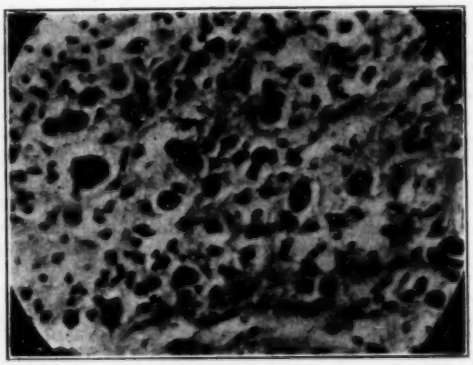
AUTOPSY.

Externally.—Slight œdema of lower extremities.

Thorax.—Pyopneumothorax in right pleural cavity, with several pints of pus from which hæmolytic streptococci were obtained in pure culture. Dense fibrous adhesions in left pleural cavity. The heart displaced to left side, but otherwise normal. Much frothy secretion in the air passages. The mucosa of the lower end of the trachea has a slightly granular surface. The right main bronchus shows thickening of the mucous membrane with a flat wart-like protuberance not obviously ulcerated, about 5 mm. in diameter, situated a quarter of an inch from the bifurcation of the trachea. Around the bronchus and extending along its branches into the lung is considerable fibrosis. The right lung is collapsed, with thickened pleura and pyogenic membrane on the surface. In the lower part of the upper lobe, just under the surface, is an abscess the size of a cherry, but with no obvious leakage of pus into the pleura. At the base of the lower lobe is a firm solid nodule about as large as a pea. The left lung is very œdematous, and there is bronchitis. The glands at the root of the lungs are enlarged, reaching a maximum of about one inch in diameter. The smaller ones are discrete, but the largest is heavily pigmented and surrounded by fibrous tissue, adherent to the right bronchus.

Abdomen.—General purulent peritonitis, hæmolytic streptococci isolated in pure culture. The stomach, intestines, pancreas, and suprarenals are normal. The liver weighs 48 oz. The anterior margin appears normal.

FIG. 2.



High-power photograph of a section from one of the abdominal glands.

On the under surface of the left lobe is a protruding, tumour-like mass of whitish material, exceedingly tough to cut, about two inches in diameter, with numerous satellites around (Fig. 1). This mass can be traced along the bile-ducts into the right lobe. There are several small flat nodules projecting slightly from the superior surface. The spleen (6 oz.) is slightly enlarged and soft, but otherwise appears normal. Masses of enlarged glands are to be seen along the upper border of the pancreas, in the hilum of the liver, and especially down the retroperitoneal region along the inferior vena cava. They are fleshy and discrete, the largest reaching to about

the size of a walnut. The right kidney is normal, while the left (5 oz.) shows a moderate degree of hydronephrosis, apparently due to the large lymph glands pressing on the ureter. No enlarged lymph glands found elsewhere.

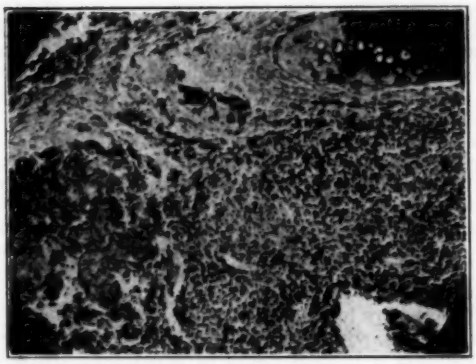
Brain and other parts normal.

MICROSCOPICAL EXAMINATION.

Glands.—The abdominal glands show extensive areas of lymphadenomatous tissue in the cellular stage (Fig 2). The thoracic glands show similar changes but are more fibrotic and pigmented.

Lungs.—Sections through the right main bronchus show infiltration of the mucosa by lymphadenomatous granulation tissue, with many typical Sternberg giant cells. Sections through the smaller bronchial tubes leading to the part of the right lung in the region of the abscess show partial blocking of the lumina by similar infiltration of the mucous membrane as shown in Fig. 3. No lymphadenomatous tissue can be recognised in the wall of the lung abscess. The nodule in the lower lobe is a lymphadenomatous deposit. The mass in the liver consists of fibrous and cellular lymphadenomatous tissue, among which a few newly formed bile capillaries can be seen.

FIG. 3.



Low-power photograph showing lymphadenomatous granulation tissue infiltrating the mucosa of a small bronchus. Part of the lumen and cartilage can be seen, also some mucous glands.

In this case the patient's symptoms on admission were entirely pulmonary and remained so until shortly before the end. Moreover, the nature of the pulmonary symptoms—viz., those of a pyopneumothorax—is one not often associated with Hodgkin's disease, nor were there any symptoms or signs of the latter to be detected in any other part of the body, or in any of the results of accessory examinations. There seems no doubt that in this case the trouble began in the deep-seated lymph glands, whether thoracic or abdominal or both it is not possible to be sure. The history only dates from about three months before admission.

Looking back from the vantage point of the autopsy, it seems probable that the pain in the back was due to pressure on the left ureter from the enlarged abdominal glands, whilst the list of repeated attacks of feverishness fits in with the existence of lymphadenoma. Actually, however, after admission, and indeed up to the time of the onset of acute peritonitis a few days before death, there was nothing abnormal to be felt in the abdomen, nor were there any symptoms referable to it. The spleen was never palpable. As the pneumothorax increased the liver was pushed down and its edge felt below the costal margin, but it seemed normal.

Pneumothorax is not a common accompaniment of lymphadenoma. R. I. Köttler [1] in 1930, when recording such a case, states that, "from available literature" it would appear that "his case is unique." So far as we have had the opportunity of making a review, we have found no other reference to its occurrence. On the other hand, it is not uncommon for lymphadenomatous changes to be found in the lungs; and although E. Kaufmann [2] states that such changes are often seen along the bronchi and arteries, we regard the pneumothorax as an accident following a more or less fortuitous chain of circumstances. In our case the lymphadenomatous infiltration of the mucosa of certain small bronchi probably caused some obstruction of the lumina, as was indicated by the diminished movements and expansion seen clinically; hence, retained secretion and secondary infection producing the abscess. This doubtless ruptured at some time into the pleura, although at autopsy no actual communication was found. The microscopic sections show that the abscess in the lung was not due to the breaking down of lymphadenomatous tissue.

Köttler's case was that of a woman, aged 23, and the duration of illness was eight months. There was weakness, fever, and wasting, and later enlarged glands in neck and axilla. She had cough, dyspnœa, and right pleurisy. The spleen was just palpable later. Ten days before death serous fluid was drawn off from right pleura and an unsuspected pneumothorax found. At autopsy a large tracheal gland was found to have broken down and formed a fistula into the œsophagus. In the upper part of the right lung were confluent foci of breaking-down material, which in one place had joined together and left a cavity the size of a walnut, with a hole (1 by 2 cm.) into the pleura. He regards this as a secondary infection of the lung in a case of Hodgkin's disease.

[1] Zeit. f. Tuberk., 1930, lviii., 37.

[2] Lehrbuch d. Speziellen Pathologischen Anatomie, 1922, Berlin, p. 205.

STAFFORDSHIRE POOR-LAW INSTITUTIONS.—The Staffordshire public assistance committee has prepared plans and estimates for the reorganisation of hospital accommodation which involve the expenditure of £243,000. It is proposed to convert the Newcastle institution into a hospital of 400 beds for the northern part of the county, and to do the same with the Wordsley institution for the southern portion. The estimated cost of the Newcastle scheme is £175,000, and of the Wordsley scheme £68,000.

WAKEFIELD FEVER HOSPITAL.—The city council are not proceeding with a suggested scheme for the erection of a new hospital at a cost of £71,000, but will improve and extend the existing one, upon which the medical officer, Dr. T. Gibson, has made a strongly unfavourable report. He condemns the present site on several grounds. It is on the smoke-laden side of the town, is increasingly surrounded by houses, the main ward pavilions are within a few feet of a public road, involving noise amounting at times to a nuisance. The windows are broken by stone-throwing from without, and there is sometimes undesirable communication between patients and outsiders. Dr. Gibson finds that the hospital does not lend itself satisfactorily to extension, and that it is not suitable for the treatment of cases of tuberculosis. There are 24 beds instead of the 60 at least that are necessary for ordinary infectious diseases. The ventilation is "quite inadequate," the hot water supply "very poor," and the gas lighting "miserable." This insufficient lighting is sometimes "a positive danger," as when a tracheotomy operation has to be performed in the middle of the night. At times more than one disease has had to be treated in one ward; there are no side wards for septic cases or dying patients, and "operations have to be performed in the wards, surrounded by screens." Dr. Gibson adds that "were it not for an adaptable and competent nursing staff public confidence in the hospital would have been shattered long ago."

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE.

SECTION OF THERAPEUTICS AND PHARMACOLOGY.

AT a meeting of this section on Jan. 12th, with Dr. E. P. POULTON, the President, in the chair, a demonstration of several forms of apparatus for administering oxygen and CO_2 was followed by a contribution on the

Uses of Oxygen and Carbon Dioxide in Medicine

by Prof. J. S. HALDANE. He reminded his hearers that in normal breathing of ordinary air the ventilation of the lung was so regulated that the partial pressure of CO_2 in the mixed alveolar air was maintained at a certain level—a level which was characteristic for each person, and usually corresponded to about 5·5 per cent. of CO_2 in the alveolar air reckoned as dry. If the supply of CO_2 brought by the blood, or the percentage of CO_2 in the inspired air, was increased, the breathing was increased correspondingly, so as to keep the CO_2 pressure in the alveolar air about normal, if possible. The increase of breathing was mainly in depth. The oxygen pressure was thus kept at about 14 per cent. of an atmosphere. But the pressure was not evenly distributed, even with normal breathing, so that some alveoli had less oxygen, others more. The consequence was that, owing to the shape of the dissociation curve of oxyhæmoglobin, the higher oxygen content at some places did not compensate for the lower oxygen at others. When breathing was shallow and rapid, even though the volume breathed might be much increased, the deficiency in the mixed arterial oxygen pressure became much exaggerated, and easily caused symptoms of want of oxygen, as shown experimentally by Meakins, Priestley, and himself. It was also shown that the symptoms of shortage of oxygen, such as Cheyne-Stokes breathing and general discomfort, were relieved promptly by adding a little oxygen to the inspired air. In such conditions as severe pneumonia or shock, in which the breathing became very shallow, dangerous anoxæmia could be prevented by adding some oxygen continuously to the inspired air, so that the available alveoli received enough. Prof. Haldane thought that in very many cases the immediate cause of death was oxygen-want due to shallow breathing, which was in turn the result of weakening of the respiratory centre. However, it was only when the blood was insufficiently saturated with oxygen that a marked effect was produced by using oxygen. A reduced pressure of oxygen in the inspired air, as in mountain sickness, or a reduced percentage of oxygen, as in many industrial accidents, could cause insufficient saturation; as also could a thickening of alveolar walls or obstruction to the passage of oxygen through them, as seen in phosgene poisoning during the late war. All cases having a markedly insufficient oxygen saturation were dangerous, and the effects were cumulative on the respiratory centre itself, the higher nervous centres, the heart, and other organs. The one exception to this rule was afforded by the chronic cases, in which the body seemed to have become acclimatised to imperfect oxygenation of the blood, so that cyanosis was unaccompanied by bad symptoms, and its disappearance on giving oxygen did not bring relief. With insufficient saturation, breathing was at first stimulated markedly; but the increase of breathing washed out too much CO_2, and this largely neutralised the stimulating effect. The breathing became shallow and frequent, because of enfeeblement of the respiratory centre.

The therapeutic administration of CO_2 was a more recent medical event than the giving of oxygen; Yandell Henderson, in America, first used it to counteract carbon monoxide poisoning, cases of the kind being relatively common in America. CO_2 was found a great aid in the expulsion of CO from the system; even with air and CO_2 the expulsion of CO was quicker than with pure oxygen. Prof. Haldane had found that in an animal rendered helpless by breathing a certain percentage of CO pure in air, the symptoms were much ameliorated when expired air was substituted for the pure air, without varying the percentage of CO, or when about 5 per cent. of CO_2 was added to the pure air. Probably the amelioration was due to increased circulation through the brain. Henderson had recently stressed another influence of CO_2. When, after CO poisoning, or after serious operations, breathing was feeble, a bronchial tube might become blocked. The result was that the air in the corresponding part of the lung was absorbed, and collapse ensued, which was apt to be followed by local pneumonia. This tendency was prevented by adding enough CO_2 to the inspired air to maintain a normal depth of breathing. In newborn infants the expansion of the lungs was liable to be imperfect, resulting in local pneumonia, and CO_2 seemed to be very useful in averting this. It was also instrumental in getting anæsthetics either into or out of the body quickly.

Both oxygen and CO_2 Prof. Haldane regarded as powerful therapeutic agents, which ought always to be available to members of the profession.

METHODS OF ADMINISTRATION.

Dr. G. P. CROWDEN demonstrated a chamber for the reception of a patient for continuous artificial respiration and administration of oxygen and CO_2, if required, to tide him over critical pneumonia and similar illnesses.[1] It had been proved, he said, of great value for children with respiratory failure due to poliomyelitis. Never previously had it been possible to keep these cases alive while their respiratory muscles were being restored to a condition of efficiency—a matter of weeks. While the patient was inhabiting this apparatus he could receive a blood transfusion through an aperture designed for the purpose.

The PRESIDENT expressed his preference for the simplest form of apparatus, namely, a mask and valves—the ordinary gas mask with a big balloon. Recently he had a severe case of bronchitis and heart failure, and pure oxygen given in this way for 15 minutes sufficed to make the patient quiet, no more oxygen being needed.

Dr. REGINALD HILTON said that the most frequent occasion for the administration of oxygen was the anoxæmia of pneumonia. It had been shown that when depth of breathing got below a certain point, anoxæmia resulted, but breathing had to be very shallow before arterial anoxæmia resulted. He had not been successful in persuading patients with pneumonia to wear a mask over their faces. Many patients who had anoxæmia did not seem to be breathing in a shallow way, and he did not now think

[1] See Drinker, P., THE LANCET, 1931, i., 1186.

that shallow breathing, either in pneumonia or in normal respiration, was as important as he had formerly believed. He had found that the pneumonia patient breathed far more, in proportion, through the mouth than through the nose.

Dr. C. G. DOUGLAS, speaking as a physiologist, said he would like to see physicians studying this subject seriously. The hopeful development had been the production of portable apparatus which allowed the giving of oxygen for considerable periods. By means of Prof. Haldane's apparatus he had given oxygen continuously for three days, during which period the mask was off for only five minutes an hour, and not every hour. During the war this form of treatment proved particularly valuable in acute pulmonary œdema, largely brought on by phosgene poisoning. To one patient who was very far gone, he had had to give 6 litres of oxygen per minute. Pneumonia patients he had not found very averse from the oxygen mask if one tried persuasion, and helped them in the early stages. A nurse could be taught in three minutes how to use it. He thought every practitioner, and certainly every hospital, ought to have an apparatus for the administration of oxygen and of CO_2.

Prof. M. S. PEMBREY said that though the claims of oxygen and CO_2 had been pressed on the present occasion he hoped no one would be misled into thinking that pneumonia was purely a matter of anoxæmia. He did not think the mortality-rate was likely to be reduced by the early use of either oxygen or CO_2, because of the pronounced cardiac and toxic effects. The value of those two agents lay pre-eminently in tiding patients over emergencies. If he were to suffer from pneumonia he would not like to have CO_2 or oxygen used from the beginning, for even slight resistance to breathing, as occasioned by the valve, was distressful in that disease.

Dr. G. MARSHALL remarked that during the war he used the nasal catheter a great deal in treating cases of gassing. The results there were so good that he had been employing the nasal catheter ever since when giving oxygen therapeutically. Dr. Marshall referred to Dr. J. J. Coghlan's paper (THE LANCET, Jan. 2nd, p. 13), pointing out the remarkable effect of inducing artificial pneumothorax in unilateral lobar pneumonia. It was definitely recognised, he said, that in unilateral pneumonia the condition improved and the respiration-rate fell if the pneumonic area was thrown out of function by inducing pneumothorax.

Prof. HALDANE, in reply, agreed that in early stages of lobar pneumonia there were no distinct indications of want of oxygen, and there seemed no reason for giving it in those early stages. The special indication for it in that disease was when the lips began to get grey; it was then likely to tide the patient over the crisis. Probably oxygen did not shorten the period of the pneumonia. When he, Prof. Haldane, lay down in bed his breathing became slower and deeper, but it was not so with all people. His breathing-rate became reduced from 14 to 7 or 8 per minute. And he was amazed to find that his breathing became periodic; alternately it got deeper and shallower. Thus in his own person he could produce Cheyne-Stokes breathing easily, but it was difficult to produce in one of his colleagues. The Copenhagen school assumed that the alveolar air was of even composition and frequency all over, but with that he did not agree. Admittedly when the practitioner found that oxygen was required he should give it in the simplest way available, but if a cylinder was used the quantity given could be measured.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

A MEETING of this section was held on Jan. 15th with Mr. VICTOR BONNEY, the President, in the chair.

Recent Researches on Sex Hormones.

Prof. E. C. DODDS read a paper on the Bearing of Recent Research on the Sex Hormones on Clinical Obstetrics and Gynæcology. He said that the first step forward in our knowledge of the sex hormones had occurred when Prof. Stockard had demonstrated the changes in the vaginal epithelium during œstrus in rodents. Allen and Doisy had shown that this change, which ceased when both ovaries were removed, could be re-established by the injection of an alcoholic extract of ovary. The next step was the discovery that this œstrus-producing substance could be also extracted from the placenta and from the urine of pregnant women. Following on this came the discovery that transplants and extracts of the anterior lobe of the pituitary could cause premature puberty in rat or mouse with the development of œstrus and the luteinisation of the ovaries. The demonstration by Aschheim and Zondek of the presence of this luteinising substance in the urine of pregnant women laid the foundation for a long series of observations, from purely chemical considerations of the hormone on the one hand to the establishment of an accurate test for the diagnosis of pregnancy on the other. Finally, Corner had shown that an extract of corpus luteum could cause the changes characteristic of early pregnancy.

Prof. Dodds then gave a survey of the present-day views. It was believed that the anterior lobe of the pituitary controlled the ovarian periodicity by secretion of the hormone referred to as prolan by the Germans and as "Rho" factor by B. P. Wiesner. This was originally said to consist of two factors, one responsible for the follicle ripening (prolan A) and the other responsible for luteinisation (prolan B). Although these two might be separate entities they had not yielded to physical separation. The stimulated ovary, with ripening follicles, secreted œstrin, which caused enlargement of the uterus, puberty, and cornification of the vagina characteristic of œstrus. The corpus luteum, in its turn, secreted another hormone called by Corner "progestin," and by Wiesner the "Beta" hormone, which apparently was responsible for the development of decidual changes and was probably responsible for the phenomenon of pseudopregnancy.

It was known that the removal of the ovaries caused the production of castration cells in the anterior lobe of the pituitary and that these cells could be made to disappear by the administration of œstrin. There was, therefore, a complicated interaction and balance of the whole system. Certain German authors had put forward the following theory to explain the periodicity of the sex cycle: the pituitary secreted prolan, which, after a time, caused the formation of a corpus luteum with its secretion progestin. The progestin then reduced the secretion of prolan so that the corpus luteum retrogressed and so the process went on. This theory would not explain the enormous production of œstrin and prolan during pregnancy when presumably the corpus luteum was continuing to secrete progestin.

The standardisation of œstrin had presented

considerable difficulties. Coward and Burn had shown by using large numbers of animals that as the amount of œstrin injected was increased, an increasing number of rats or mice showed œstrus. It had therefore become necessary to carry out standardisation on large numbers of animals and all previous quantitative work had been rendered useless. The point where 50 animals showed œstrus and 50 did not, had, by common consent among workers, become the standard for œstrin. Other variations in the effectiveness of a dose were produced by the purity of the material and by the mode of administration. Very pure œstrin was excreted so rapidly that it was gone before œstrus occurred; larger doses were required for oral administration than for injection, and far fewer units were required for oral administration of crude œstrin than of the pure material. Furthermore, the activity of a quantity depended on the number of doses into which it was divided. Very little was known of the nature of the prolans except that they were complicated substances containing nitrogen.

Turning to the clinical application of this research Prof. Dodds said that œstrin had been recommended for every gynæcological condition—amenorrhœa, menorrhagia, hæmophilia, and a host of other conditions. The prolans had been similarly recommended. The expense of progestin, due to the difficulty of obtaining corpora lutea, was an obstacle to its clinical use. Probably all work in the past had been carried out with grossly inadequate doses. He suggested that work should be confined to clear-cut cases about which much is known and that large doses of œstrin should be given. It should be possible to make preparations which would be slowly absorbed; large doses of crystalline material appeared to be wasteful and useless. The Aschheim-Zondek test for pregnancy was the only definite clinical aid that had so far come from this work. In conclusion, he offered a warning with regard to the indiscriminate use of prolan. It was known that the ovary of an animal could be converted into a solid mass of lutein tissue by the administration of this material and it would be undesirable to run any risk of producing this effect in women.

UNITS OF DOSAGE.

Prof. A. S. PARKES said that standard units as a measure of œstrus-producing hormone did not exist, but it would be possible to standardise the œstrus-producing hormone within 10 per cent. by the method of Coward and Burn. The test depended on the cornification of the vagina of a mouse or rat; in these animals the amount required to produce the cornification varied with the method of administration, the time over which it was spread, and the number of doses into which the material was split. Disregarding for the moment these large variations, the laboratory unit was a rat unit or a mouse unit. By keeping strictly to the same method with these two animals Prof. Dodds and Mr. G. F. Marrian, D.Sc., had shown that the dose required for rats was ten times that for mice. Cornification was only one symptom of œstrus and the amount of hormone required to produce full œstrus, judged by distension of the uterus, was found to be very much greater. Marrian had found that the necessary dose was about 200 times greater in the mouse and it was likely that a similar factor held for the rat. In larger animals the figures were still more startling. To produce œstrus in the ovariectomised ferret or rabbit the figures mounted rapidly into thousands and 100,000 mouse units were required to produce full œstrus in a baboon weighing 10 kg. The dosage was thus found to vary strictly on a weight for weight basis, and so continuing the curve upwards the clinical dose became half a million mouse units for a woman. Various reliable preparations were on the market, one of which cost 30*s.* for 2000 units. If half a million units were necessary for a woman and this figure were multiplied by 12½, the factor for oral administration, the cost of one effective dose would be £9000. The reasonable dosage for clinical use was a very urgent problem and a revision of our ideas of the clinical application of the œstrus-producing hormone was urgently required.

CLINICAL TESTS.

Dr. H. GARDINER-HILL said that he had been provided by Prof. Dodds with standardised extracts of œstrin for four years. This material had been tried out on cases of amenorrhœa and of climacteric phenomena. He had classified the cases into those of (1) primary amenorrhœa (normal individuals with delayed development, wasting diseases, and glandular defects), (2) primary menstrual irregularities, which were minor degrees of the first group, and (3) secondary amenorrhœa. None of group 1; one-third of group 2; and in group 3 over half the cases of secondary amenorrhœa due to simple causes such as climate, shock, or pregnancy had been affected. Secondary amenorrhœa due to glandular defect had been unaffected. Two cases were striking; both patients complained of amenorrhœa and sterility; both menstruated after injection of 180 and 200 mouse units respectively, became pregnant and had normal children. Dr. Gardiner-Hill thought that preparations of œstrin such as those provided by Prof. Dodds were worth further clinical trial in carefully selected straightforward cases of amenorrhœa of the type he had discussed. He realised the difficulty of assessing clinical results in these conditions, but nevertheless thought that it was difficult to account for the changes in his cases except on the supposition that they had in some way resulted from treatment with œstrin. When the relative size of the human being and the experimental animals were taken into consideration the effective dose certainly seemed to be small, but the œstrus-producing effect in animals mentioned by Parkes appeared to be quantitative. Could not the clinical results be explained on the "trigger" hypothesis of W. Shaw—a small dose stimulating a sub-functioning follicular apparatus to produce active follicles and so initiating the cycle which ultimately resulted in the menstrual discharge?

CHEMICAL CONSTITUTION.

Dr. Marrian said that in 1927 Aschheim and Zondek discovered the presence of œstrus-producing hormone in urine. The next step was in 1928 when Funk showed that the œstrus-producing hormone had the acidic properties of a phenol. This gave the clue which led to the isolation by three independent workers of a crystalline material with an empirical formula of $C_{18}H_{22}O_2$. It proved to be a hydroxyketone. A little later Dr. Marrian himself had isolated an œstrus-producing compound with the formula $C_{18}H_{24}O_3$ with three hydroxyl groups. Butenandt had then shown that both these substances were present in the urine of pregnant women, and that one could be converted into the other by distillation with potassium sulphate; they were therefore obviously related chemically. The first of these ($C_{18}H_{22}O_2$) was more potent physiologically than the second, and a distinction should be made

between the substances when mention was made of œstrus-producing hormone. The ketone gave its maximum response 24 hours after injection, whereas the tritrodroxyl compound gave a longer latent period and a much more prolonged response. Dr. Marrian suggested that further work should be conducted by using injections of the crystalline material only in order to obtain clear-cut results.

REACTIONS OF ENDOMETRIUM AND UTERINE MUSCLE.

Dr. J. M. ROBSON said that it was important to know something of the sex cycle in the human in order to understand the action of these hormones. Under the influence of the corpus luteum hormone the endometrium was built up during the latter half of the menstrual cycle, to degenerate with the occurrence of menstruation. There was also a change in the uterine muscle when under the influence of the corpora lutea, in that it would not respond to pituitrin. Similarly the uterine muscle of a virgin animal which had been injected with corpus luteum extract did not respond to pituitrin; nor did the pregnant uterus, but at term the corpus luteum subsided. An observer who had inserted bags connected to manometers into the human uterus had shown that intravenous injection of pituitrin caused contraction during the first half only of the cycle. It was likely that the reactions in the endometrium and the muscle were independent and could be dissociated; dysmenorrhœa would result when the pituitary acted on a uterus whose endometrium had not fully degenerated. Cases of dysmenorrhœa, secondary amenorrhœa, and habitual abortion had all shown improvement after treatment with œstrin; those of primary amenorrhœa had not.

Mr. T. C. CLARE disputed the current interpretation of the fact that an ovary-stimulating substance was found during pregnancy in urine. This hormone, he argued, must be a chemical substance and as such must be fixed or absorbed by activity. When, therefore, it was being excreted unchanged it was either being produced in excess of the body's need, or else the demand had been reduced. This fixation might be physiological or pathological. It would be interesting to know if the Aschheim-Zondek reaction were positive in a young woman immediately after hysterectomy. An appreciable proportion of cases of malignant disease of the uterus had given a positive reaction; this fact might be significant in the ætiology of cancer. He suggested that it was merely due to excess of hormone as the uterus was failing to fix the full quantity.

Dr. MARRIAN, in reply, said that Mr. Clare's theory was based on a false supposition that the presence of the hormone in urine indicated failure of fixation. Nothing was known of the nature of the hormone; if, as was possible, it acted like a catalyst, arguments based on quantitative fixation would fall to the ground.

The PRESIDENT said that there was no doubt that many claims in the past for the extracts had been absurd. The cause of the profusion was the confusion of the post and propter hoc; it was so easy to forget the action of chance. A girl of 20 was given an extract and afterwards started to menstruate; although the chances might be ten to one that she would do so in any case, it was tempting to attribute falsely the menstruation to the treatment. He hoped that when obstetricians or gynæcologists had clear-cut cases they would refer them to a biochemist who could make good scientific use of the case. Surely it should be easy to refer to the biochemist the problem of how much use was the ovary after hysterectomy.

Prof. DODDS said that hysterectomy led to a cystic condition of the ovaries which was abated by giving an extract of uterus.

The PRESIDENT suggested that as there was luteinisation of the ovaries in vesicular mole it would be interesting to examine the hormone content of vesicular moles when suitably large ones were available.

Demonstration of Specimens.

Mr. T. G. STEVENS showed a rhabdomyosarcoma of the cervix removed from an unmarried woman, aged 23, who had had slight intermenstrual bleeding for 12 months and recently a stabbing pain in the abdomen. The tumour which was attached to the cervix by only a thin pedicle was thought to be a large mucous polypus and was removed in the out-patients' department. Sections, however, showed small striated muscle-fibres, and also smooth muscle-fibres in a fibrous tissue stroma, and there was an incomplete covering of squamous epithelium. A few glands but no cartilage were present. Mr. Stevens considered that in spite of the presence of striped muscle tissue, which was unusual, the tumour was highly malignant; he therefore performed panhysteroöphorectomy. No secondaries were seen in the abdomen, and the growth ceased abruptly where the pedicle joined the cervix. Deep X ray therapy was subsequently given. Judging by all reported cases the prognosis was poor.—Dr. F. J. MCCANN said that he had seen a few cases which had contained cartilage. There had been early recurrence in each case.—The PRESIDENT reported that he had seen several cases of sarcoma during the last few years, but none had contained striped muscle tissue. In two cases operation had not been followed by recurrence. He doubted whether it was advisable to remove both ovaries, especially in so young a patient, although X ray therapy was given. He had seen recurrence in an ovary.—Mr. STEVENS replied that he held very strongly that ovaries after the removal of the uterus are of no use at all. He had removed both in this case because he wished to remove entire the whole lymph tract.

Mr. LOUIS C. RIVETT showed a foreign body which had been removed from the lumen of the small intestine ten years after he had performed Cæsarean section. Convalescence had been delayed, the patient stated that she had not felt well since then, but she had only recently consulted her doctor. On examination a mass was found in the upper abdomen. At an exploratory operation the intestines were found to be matted together and considerable anastomosis had occurred. A foreign body found within the lumen of the matted intestines was removed through a hole which was sutured and drained. The patient made a good recovery and afterwards only complained of slight diarrhœa. The foreign body which Mr. Rivett had in his own keeping proved to be extensive fæcal concretions round a large gall-stone.

POST-GRADUATE WORK IN BERLIN.—International medical post-graduate courses are to be held in Berlin on the following subjects: internal medicine (Feb. 29th to March 5th); occupation and disease (March 7th to 14th); recent results of scientific research and their employment in obstetrics and gynæcology (March 14th to 19th); surgery (April 4th to 9th); and practical progress in X ray diagnosis and treatment (April 10th to 17th). Particulars of these and of the regular courses may be had from the information bureau of the Kaiserin Friedrich-Haus, Luisenplatz, 2, Berlin, N.W.6.

TUBERCULOSIS ASSOCIATION.

AT a meeting of the Tuberculosis Association on Jan. 15th a discussion took place on the

Psychotherapeutic Treatment of Tuberculous Patients.

Dr. S. VERE PEARSON, opening the discussion, said that he, in dealing with smaller numbers of patients than many of the physicians present, probably had the advantage of being able to devote more individual attention to the patients under his care; and hence it was probable that his patients were more frequently able to unburden their troubles and worries than would be possible in larger institutions. This mere unburdening was often of definite therapeutic value, and anything like psycho-analysis was very seldom necessary. All experienced sanatorium physicians knew how important it was to have a constant stream of mental encouragement playing upon the mind of the patient, this, in conjunction with good environment and proper treatment of the physical condition, being usually sufficient to bring about satisfactory improvement. In considering the pathogenesis of tuberculosis he believed that too much emphasis was laid upon infection by the tubercle bacillus and too little upon the psychological influences involved. In order to get a patient well they had to take into account all the ætiological factors concerned. It was necessary to recognise all the conditions which had wrought a "discord of the elements within the body," otherwise harmony and health could not be brought about. A realisation of these factors was equally necessary for diagnosis, prognosis, and treatment. Unless the psychological condition of a patient was taken into account, mistakes in diagnosis were bound to occur. It had been said that "phthisis *always* had an origin in discouragement," and although this might be only partially true they had to remember the possibility of a "psychological flight into illness." It was important for the physician in charge of a case at least to bear in mind the possibility of pulmonary tuberculosis not being the cause of the lapse from health, or of its being only one of the causes and perhaps, even in a case with markedly abnormal physical signs in the chest, one of comparatively minor importance.

The Mind in Tubercle.

Dr. ANDREW MORLAND (Mundesley Sanatorium) followed with a paper on this subject, which is published in full on p. 176 of this issue.

Dr. LEONARD F. BROWNE, dealing with the psychotherapeutic treatment of tuberculous patients, pointed out that tuberculosis being a chronic disease should be viewed from the psychotherapeutic aspect just as in the case of any other chronic toxic disease. While psychotherapy could not supersede physical treatment, it could reinforce it admirably in certain directions. The patient's attitude to life would make an enormous difference to his powers of resistance. Upon admission to the sanatorium some routine psychological examination should be made, so that the physician might get a picture of the type of personality with which he was dealing. Information as to the patient's heredity and family environment should be acquired. Reaction to former illnesses was of importance, and full particulars should be obtained of the patient's sexual history, attention being paid to any indications of arrested or warped development. The question of anxiety should be gone into, and inquiry made as to the patient's ability to adjust difficulties in his environment. In the very first interview the doctor would have the opportunity of establishing that relationship with the patient which was so valuable a therapeutic asset. The importance of the personal factor was being more and more recognised in industry, in politics, and in international relations. It was no less important in the sanatorium, and the personality of the physician played a large part in the treatment of the disease. In the long treatment which tuberculosis so often required, the relations between the doctor and his patient became very intimate. There was probably no disease which called for higher personal qualities in the medical man who treated it than tuberculosis. A strong personality, wide sympathy and understanding, approachableness, infinite tact and discretion, a willingness to discuss problems, and a sense of humour were essential qualities in dealing with the varied temperaments and mental outlook of patients suffering from this disease. The method of suggestion or persuasion was of value in dealing with the general attitude of the patient to his disease and in overcoming certain troublesome symptoms which might arise during its course, such as insomnia, cough, or anorexia. In other cases, however, patients suffering from such conditions as anxiety states or conversion hysteria—which might in themselves have paved the way for the tuberculous infection—would require analytical treatment, although it would always be a question whether any given case was suitable to undergo the strain of analysis, and the advantage of mental improvement would have to be weighed against the possibility of physical deterioration. In conclusion the speaker emphasised the importance of treating the personality of the patient. His individuality should never be lost sight of; his mental attitude should be studied and taken into account in the doctor's dealings with him. It would be an immense help for the staff of every sanatorium to include a physician with some knowledge of psychotherapy so that special treatment could be provided when necessary. In any case, for any doctor dealing with tuberculous patients a knowledge of the mental mechanisms would enable him to deal with the patient's reactions on the spot, and incidentally would greatly increase the interest of his work.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this society on Jan. 8th, with Dr. H. H. MILLS, the President, in the chair, was devoted to a discussion on the

Treatment of Carcinoma.

Mr. MALCOLM DONALDSON pleaded for the setting-up of diagnostic centres for cancer. It might be suggested that this would increase the number of neurasthenics, but he personally believed that the more malignant disease was talked about the less would people be frightened of it. Centres for diagnosis should be established all over the country, but the treatment centres, on the other hand, ought to be few and concentrated. If advance was to be made in treatment the cases must be brought to places where special team-work could be undertaken. After treatment the patients must be seen at least once a month in the first year, and must report three or four times a year for the rest of their lives. Going on to speak of therapeutic methods, Mr. Donaldson said that the

vast majority of gynæcologists now—certainly in other countries, and increasingly in this country—believed that radiotherapy was preferable to surgery in the treatment of cancer of the cervix. In cancer of the body of the uterus surgery undoubtedly showed better results than radiotherapy, though the latter might prolong the patient's life in cases unsuitable for operation. Carcinoma of the vagina should be treated by radium; malignant disease of the ovary seldom gave rise to symptoms before it was past all hope of relief by operation.

Dr. A. PINEY thought that the problem of the treatment of cancer was ultimately a problem of chemotherapeutics. Work had lately been done on the injection of various colloidal dyestuffs, which appeared to be stored in the tumour cells more than in the normal tissue cells, and attempts had been made to introduce solutions of heavy metals with the idea that the tumour might then be better treated with X rays. None of these methods as yet had proved successful, even in experimental animals, but they pointed the way to ultimate rational treatment of the malignant cell. It appeared to him that at present surgery must inevitably be of enormous importance, for removal of tumour cells must be preferable to destruction in situ, in view of the possibility that some of them might receive a stimulating growth of rays. Tumour cells sometimes grew fast when their neighbours had been destroyed.

Mr. DUNCAN FITZWILLIAMS declared that the improvement of results during the last 40 years was due solely to early diagnosis, and not in the least to increased range of operation. Nowadays the young practitioner who saw a tumour realised that it should be regarded as malignant until it was proved innocent, and that the onus of proof was on himself. Until this was recognised no advance would be made. A good deal could be done by educating the lay public not to ignore bodily ailments of which they knew nothing, and to go to their doctor and get advice. The Americans, who were untrammelled by the traditions which bound us, had instituted "cancer weeks," during which it was a point of honour for every person in the town to go to his medical practitioner and be examined thoroughly; if he could not afford a fee, payment was made by the local cancer committee.

Sir J. DUNDAS-GRANT was convinced that where a malignant disease was removable it ought to be removed. When he was in general practice the cervix uteri used to be removed, and in many cases the cure was permanent. He believed in the combination of surgery and radiotherapy, and that this would be more and more developed.

Mr. J. F. MCCANN said that the lesson of occupational cancers was being ignored. These could, almost without exception, be prevented by taking the necessary precautions. In this matter we suffered a great deal from the tyranny of pathology. Most people now believed that cancer was in the beginning a local disease—an idea that had been fostered through laboratory experiments. But he held the contrary opinion. He preferred to make his judgment on the human, and had found that in very early cases there was always a certain departure from health—the primary cachexia of former writers. In some cases it might be slight and escape notice, in other cases it was extreme. It had to be remembered also that cancer was primarily a disease of middle or advanced age.

Dr. S. MONCKTON COPEMAN spoke as one who had been a member of the committee on cancer set up by the Ministry of Health. From the investigations of that committee it was apparent that about 50 per cent. of cases of cancer never underwent treatment of any kind whatsoever. He mentioned favourably the chemotherapeutic method which depended upon the use of fluorescein irradiated by X rays or radium.—Dr. J. E. A. LYNHAM pleaded for a medical rather than a surgical conception of radiology in this disease.—Dr. RICKARD LLOYD rebutted comments on the general practitioner's inability to diagnose cancer.—The PRESIDENT mentioned the presence of tumours apparently carcinomatous in very aged people. He had one case in mind in a woman of 95, who to his knowledge had had a huge abdominal swelling for several years; but her primæ viæ were open, and she was apparently well.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF PATHOLOGY.

A MEETING of this section was held on Jan. 8th, with Dr. J. LAIT, in the absence of the President, in the chair. Mr. F. J. HENRY showed for Sir William Wheeler a

Solitary Serous Cyst of the Kidney.

The specimen had been removed from a woman aged 57. She had complained of intermittent attacks of painless hæmaturia, and presented a smooth mobile non-tender enlargement of the right kidney. A pre-operative diagnosis of hypernephroma had been made, but at operation a large solitary cyst was found in the upper pole of the right kidney. This cyst was removed by conservative resection, a small layer of renal tissue having been shaved off. The patient made an uneventful recovery.

The CHAIRMAN said he did not think that cysts of the kidney were as rare as they were supposed to be. He was interested to hear that urea was found in the cystic fluid, for this was a very uncommon finding.

Mr. HENRY, in replying, said that Sir John Thomson-Walker regarded solitary cysts of the kidney as extremely rare. McKim and Smith in America had reported 120 cases, two of which were from Dublin. In their cases hæmaturia was a very unusual feature. They called attention to the necessity of distinguishing between true solitary cysts of the kidney and perirenal cysts.

Endothelioma of the Pleura.

Dr. J. LEWIS showed a specimen from a woman, aged 41, who had suffered for some months from pain in the left side of the chest. She had paroxysmal pains which radiated down the left arm. She developed a serous pleural effusion which later became hæmorrhagic. Only one enlarged gland could be found, situated behind the left clavicle, and it was removed for histological examination. The left pupil was dilated. Post-mortem examination revealed a thickened pleura and a hæmorrhagic effusion. There were plaques of endothelioma studded over the parietal pleura and on its diaphragmatic surface. There were also some plaques on the pericardium. Secondary deposits were found in the liver, kidneys, and mediastinal glands. Histologically the tumour was a typical endothelioma.

REVIEWS AND NOTICES OF BOOKS

Intracranial Pyogenic Diseases.

By A. LOGAN TURNER, M.D., F.R.C.S. Edin., and F. ESMOND REYNOLDS, M.D., M.R.C.P. Edin. London: Oliver and Boyd. 1931. Pp. 271. 12*s*. 6*d*.

SOME nine years ago Mr. Logan Turner and Dr. Esmond Reynolds began to investigate the pathways by which infection spreads from the face, nasal, and paranasal air cavities into the intracranial chamber, and this monograph gives a full account of their work. They have carefully studied 55 cases, mostly fatal, of intracranial infection following such conditions as ethmoidal and sphenoidal suppuration, and in a considerable number of these they have conducted exhaustive morbid anatomical investigations along special lines. Their method has been to remove at necropsy a large part of the floor of the anterior and middle cranial fossæ and then to examine in serial sections the upper part of the nose, the air sinuses, orbits, base of the skull, cavernous sinuses, and overlying membranes. In spite of the frequency of fatal intracranial infections from these sources the authors have only been able to find in the literature eight cases in which adequate investigations of this nature have hitherto been made.

As a result of their work Mr. Logan Turner and Dr. Reynolds conclude that in their 55 cases infection spread to the intracranial cavity by the venous blood stream in 19 cases, by direct extension through bone and dura in 20 cases, by a combination of these two routes in eight cases, and along the perineural sheaths of the olfactory nerves in four cases. In four cases the pathway of infection could not be determined. Selected cases are described in full to illustrate the various paths of infection, and there is an excellent account of the venous and other connexions between the face, nose, and paranasal air cavities, and the intracranial chamber. The authors show effectually that there is no lymphatic pathway from the nose to the cranium.

Septic thrombosis of the cavernous sinuses occurred in 22 cases, especially after infection of the sphenoidal air cavity. The authors describe fully the symptoms of this condition, and as far as possible correlate the symptoms with the pathological changes that their studies revealed. Their researches show that it is not possible to interpret all the symptoms conclusively, because most fatal cases show infection of more than one intracranial structure; for example, there are intimate venous connexions between the cavernous sinus and the meninges, and suppuration in the cavernous sinus is likely soon to be followed by purulent pachy- and leptomeningitis. Brain abscess is relatively uncommon in their series. In describing leakage of brain abscess no reference is made to leakage into the lateral ventricles, probably the most common method of spread of abscess of the cerebral hemisphere.

The book contains important observations about intracranial infection following operation on the paranasal air cavities, a subject on which there has hitherto been very little accurate information. In 45 cases in which the primary focus of infection was in the paranasal air cavities, intracranial infection occurred spontaneously in 25, while in 20 it developed shortly after operation on one or more of the diseased air cavities. Operation on the ethmoidal cells of the type introduced by Sluder appears to be particularly dangerous in this respect, and may result in spread of infection either by producing fracture of the floor of the anterior fossa, laceration of the olfactory perineural sheaths, or in some instances by setting up acute osteomyelitis of the cranial and facial bones. Alarming as they are, complications of this sort occurred in only about 1 per cent. of a large series of operations on the paranasal air cavities at the Royal Infirmary of Edinburgh, and most often in those cases in which more than one paranasal air cavity contained pus and only one was drained by operation. It is possible that the liability to intracranial infection after paranasal operations may be considerably diminished by more free exposure of the infected areas.

This beautifully produced monograph follows the best traditions of Scottish medicine and is fit to be placed alongside the classic work of Macewen on intracranial infections. There is only one criticism of importance: that the authors have been unduly cautious in drawing the conclusions of a clinical nature that their work entitles them to make, especially conclusions as to treatment. The reader is left wondering what their views about surgical intervention in chronic paranasal infections really are; and whether this work has promoted the clinical recognition of those cases that are likely to be followed by fatal intracranial infection if operation is undertaken. There is no one more entitled to propound such views than Mr. Logan Turner, and no one from whom the general medical reader would more welcome them.

The Pathology of Diabetes Mellitus.

By SHIELDS WARREN, M.D., Pathologist to the New England Deaconess Hospital, and the Huntingdon Memorial Hospital, Boston; Instructor in Pathology in the Harvard Medical School, Boston, Massachusetts. London: Baillière, Tindall and Cox. Pp. 212. 21*s*.

THIS monograph is important inasmuch as it contains a full and exhaustive account of the pathological lesions found in all the organs of the body of patients who had diabetes mellitus during life. Rather more than one third of the monograph is devoted to a description of the islands of Langerhans, together with the proof that the β cells supply insulin to the body. The evidence for the pathological changes is set out fully, and Dr. Warren points out that, although the β cells undoubtedly secrete the insulin, the changes which occur in the islands in patients dying of diabetes mellitus by no means afford conclusive proof of this. The most typical change is hyalinisation, which destroys or separates the epithelial cells from the blood-supply. The diabetes which is associated with hyalinisation of the islands is apt to be mild, and, even in patients over 40 years of age, a fair number of cases are described in which hyalinisation existed without the occurrence of diabetes.

In the older patients fibrosis tends to occur as well as hyalinisation. Lymphocytic infiltration in and about the islands has been observed, especially in severe cases of short duration. Much importance is attached by Allen to hydropic degeneration, as a result of his observations on partially depancreatised animals. This change appears to be due not to the result of injury but to excessive functional strain, and its appearance is thus a sign that an increased strain is being put on the β cells. Hydropic degeneration is

not always present in patients dying from diabetes, and, moreover, post-mortem changes may cause very similar appearances. One of the difficulties of assessing the importance of these changes lies in the fact that in 69 out of 259 cases the pancreas showed islands which appeared quite normal.

The distribution of glycogen in the body of normal patients, and in diabetics who have been treated with and without insulin, is of great interest. An increase of glycogen in the epithelium of Henle's loops is the most definite anatomical finding in active diabetes mellitus, but the heart muscle also contains more glycogen, and the liver cells have vacuoles which are filled with it. The skin of the diabetic, on the other hand, contains very little glycogen. Dr. Warren deals fully with arterio-sclerosis and gangrene in diabetics. Statistical evidence that a premature development of arterio-sclerosis occurs among the diabetic patients is conclusive. Although this condition is especially common among the elderly patients, it occurs also among the young. Seven out of 23 patients under 20 years in the series showed definite changes in the arteries when X rayed. Arterio-sclerosis was the actual cause of death in 72 out of 300 cases. In 31 of these a coronary thrombosis was present, and in 27 gangrene of an extremity. The factor or factors which may be responsible for the premature development of the arterio-sclerosis in diabetics are discussed. The view is put forward tentatively that it is in some way due to the initial period of hyperglycæmia which causes the damage, and is followed up by the hypercholesterinæmia arising as the result of a diet containing too much fat and too little carbohydrate. The appendix contains an analysis of the cause of death in 1294 diabetics.

The book is well indexed and provides information of high value to all interested in the subject.

The Cardiac Cycle.

By HARRINGTON SAINSBURY, O.B.E., M.D., F.R.C.P., Consulting Physician to Royal Free Hospital, Victoria Park Hospital for Diseases of the Chest, and Royal National Hospital, Ventnor. Bristol: John Wright and Sons, Ltd.; London: Simpkin Marshall, Ltd. 1931. Pp. 79. 5*s*.

IN his small monograph on the cardiac cycle Dr. Harrington Sainsbury advances the hypothesis that the pulse wave is produced not by the ejection of blood from the left ventricle into the aorta, but by the impact of the ventricular contents against the closed semilunar valve during the isometric phase of ventricular systole. This hypothesis is so entirely incompatible with the known experimental facts, that one cannot help wondering whether his meaning may not have been misunderstood. His argument appears to be that the force exerted during systole against the ventricular surface of the closed aortic valve must produce an equivalent pressure change in the aorta which will be transmitted along the arteries to the periphery, and that this pressure change constitutes the pulse. That there is a slight rise of pressure in the aorta corresponding in time to the rise of pressure in the ventricle prior to the opening of the aortic valve is well known; but this rise is insignificant as compared with the rise of pressure which accompanies ventricular ejection. In order to upset the current teaching that the percussion wave of the pulse is initiated by ventricular ejection, it would be necessary to bring forward experimental evidence to prove that the time relations of the pressure changes in the heart and aorta observed by previous workers are incorrect. Dr. Sainsbury does not suggest that this is so, nor does he bring forward any new experimental evidence in support of his views. His argument is purely philosophical, and if we have understood it correctly, it is unsound.

The Lungs and Early Stages of Tuberculosis.

By LAWRASON BROWN, M.D., Consultant, Foudeau Sanatorium; and FRED H. HEISE, M.D., Medical Director of the Sanatorium. London: D. Appleton and Co. 1931. Pp. 151. 5*s*.

THE object of this book was to present the subject of tuberculosis "from a standpoint that can be readily understood by the layman," and it has been achieved. Members of public health committees, health visitors, nurses and, indeed, all who are interested in preventing disease and in safeguarding the health of the young, will find in this book all they require for an understanding of the problem of tuberculosis, whether regarded as a disease of the individual or as a menace to the community. The chapters on the early symptoms of tuberculosis and the means which should be adopted for its detection might be read with advantage by all medical students. And medical practitioners might profit from the reminder that in a doubtful case no examination of the chest is complete which does not include a radiogram of the best obtainable quality, interpreted by someone who has had special experience in chest radiography.

Fractures.

By MEURICE SINCLAIR, C.M.G., M.B., B.Ch. Edin., Major, R.A.M.C. Ret., Specialist in Fractures and Orthopædic Surgery to St. James' and Paddington Hospitals, London. With an introduction by Sir ROBERT JONES, Bt., K.B.E., C.B., F.R.C.S. London: Constable and Co., Ltd. 1931. Pp. 550. 24*s*.

THOSE who were familiar with Major Sinclair's work during the war at No. 8 Stationary Hospital know him as a master of technique and painstaking care, whose results in the treatment of war fractures were an inspiration to all who came in contact with them. We welcome an account in book form of his principles and methods of treatment. The first part of the monograph is devoted to a consideration of principle and the second to detailed methods of treatment of individual fractures, and both are clear, well written, and full of interest from beginning to end. There is a certain air of dogmatism which might be irritating to those who do not discern in it the mark of the enthusiast; the insistence on attaching the author's name to splints and apparatus might equally seem exaggerated to a generation which does not remember the difficulties which any original work had to overcome during the war before gaining recognition. No one should allow any such minor points to lead them to neglect this work. It should be studied by every one who is concerned with fracture cases, and should do a good deal to remove the reproach that the lessons so slow and painfully learnt during the war are being forgotten with indecent haste. Sir Robert Jones says in his introduction that the author's services at the front were memorable and never received the recognition they deserved. This book should do much to secure for him appreciation of his mastery of the technique of the treatment of fractures.

Radiology in Relation to Medical Jurisprudence.

By S. GILBERT SCOTT, M.R.C.S., L.R.C.P., D.M.R.E. Camb., Consulting Radiologist to the London Hospital and to Queen Alexandra Military Hospital, Millbank. London: Cassell and Co., Ltd. 1931. Pp. 65. 7*s*. 6*d*.

THIS small volume aims at assisting radiologists in medico-legal cases. It is based on the wealth of material that has passed through the author's hands in the course of 22 years, during which time he has been in charge of the radiological department of the London Hospital. With such a vast experience behind him Dr. Gilbert Scott might well have written a rather more ambitious work. It only contains 65 pages, and a quarter of these are devoted to an extremely elementary statement of the fundamentals of radiology, written for the benefit of the legal profession.

The author confines himself to the osseous system, and says that he has made no attempt to describe all the variations from the normal nor every one of the fallacies and pitfalls which beset radiologists in general medicine. Hence the work is somewhat incomplete even in the limited sphere that the author has chosen. One omission should be rectified in a future edition. Dr. Gilbert Scott, while describing the usual spinal conditions, fails to emphasise the fact that the absence of radiographically demonstrable bony injury does not necessarily mean that the patient has not received an injury and that this injury is real. In the courts stress is laid on the positive evidence of an injury as shown by the radiographs, and compensation results as a matter of course, even though actual disability may be slight. The absence of radiographic evidence of injury prejudices a man's claim for compensation and many cases of miscarriage of justice result. It is the radiologist's duty in such cases to emphasise the limitations of his technique and to stress the fact that the decision in such a case must not be influenced by the absence of changes that can be detected radiographically. This is an important point, especially in spinal cases. The 25 radiographic illustrations are well chosen and excellently reproduced.

NEW INVENTIONS

AN ELECTRIC OPHTHALMOSCOPE.

THE optical part of this ophthalmoscope was shown to the Ophthalmological Society of Great Britain and Ireland in 1904, and a description of the mechanism was given in THE LANCET (1905, ii., 28). Recently, Messrs. Rayner, of Bond-street, London, who had acquired the original patterns, asked me if I would supervise the adaptation of the original reflecting ophthalmoscope to a self-contained electric fitting.

The new model has certain advantages. The attachment of a battery handle to a magazine ophthalmoscope, such as Couper's or Morton's adaptation thereof, produces an inconveniently long instrument. This new ophthalmoscope, although it has a range of 70 dioptres, from +30 to −39 in steps of 1 dioptre, is no longer than a May's ophthalmoscope with its small range of lenses.

The range of 70 dioptres is produced by 15 actual lenses. The mechanism which I adapted to this ophthalmoscope was invented by Harding, an engineer of Leeds, about 1870, and is thoroughly reliable. It has been extensively used in speed indicators, meters, and stop-watches. The first of these ophthalmoscopes, made in 1903, I have used regularly since then; it has never got out of order.

There are two lens discs. These overlap at the sight hole. The larger, or "units" disc has ten holes, one blank and nine glazed from −1 to −9 dioptres. At one point on the rim of this disc there is a finger-like projection. The smaller, or "tens" disc has seven holes, one blank the others glazed +10, +20, +30, −30, −20, −10 dioptres. On one face of this "tens" disc is a spur wheel of seven teeth. As the driving wheel is turned past 9 dioptres, the "finger" of the "units" disc automatically engages with the spur wheel and moves the "tens" disc one place either way, according to the movement of the driving wheel. The edge of the "tens" disc is milled, and one part is exposed through the edge of the body of the instrument, so that it can be turned directly to bring a strong convex lens to the sight hole.

In providing an electrical attachment, the aim has been to secure the widest, most variable, and most stable range of illumination. The battery supplying the lamp is a standard "Ever Ready" pattern No. 1829. It will keep the lamp burning continuously for over 13 hours, still giving sufficient illumination for examination of the fundus; continuous discharge is a severe test. The lamp is gas-filled, and has a small coil filament.

A focusing lens controlled by an external collar regulates the beam from the instrument. When the collar is at the bottom position, a slightly diverging beam giving the effect of a plano mirror retinoscope is produced. As the collar is moved upwards the beam becomes converging, until a very short focus is reached, after which the beam becomes increasingly divergent. At a distant of one inch the illumination varies from considerably over 100 foot candles with the filament almost focused, to about 30 with the most widely divergent beam. By using the resistance in the circuit the divergent beam can be reduced to 2 foot candles. Great care has been taken to ensure a fine control of the focusing movement.

Four cells are hinged to the lamp tube and can be interposed between the light and the mirror. They contain filters, red, green, and "daylight," and a diaphragm with a small central hole. These screens can be readily brought into use and are very serviceable.

The instrument is excellent for retinoscopy at the distance of one metre, either with the white or red light. It has proved itself to be a first-rate emergency operation lamp, since it will throw a beam of parallel rays of about 20 foot candles from a distance of 6 inches which will illuminate the eye and lids; and as the ophthalmoscope is held horizontally above the eye it is easy to keep it in position and out of the operator's way.

Finally, mention may be made of the covering of the handle which contains the battery. This is coated with an even layer of fine sand which gives a perfectly easy grip. The instrument can therefore be held easily with the fingers with no sense of risk of slipping and without the damp chilly feeling which comes to leather covered handles after much usage.

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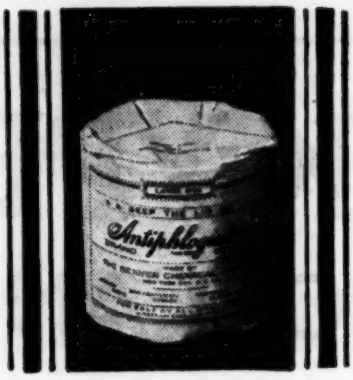

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THE LANCET.

LONDON: SATURDAY, JANUARY 23, 1932.

THE CERTIFICATION OF BLINDNESS.[1]

A COMMITTEE was appointed in November, 1930, by the Union of Counties Associations for the Blind to report on the problems of the prevention of blindness. The committee, which was given power to coöpt persons to its body, availed themselves freely of the permission, and the result is a unanimous report of extensive utility. For the economic importance of blindness from the national point of view has been pressing since 1919, when grants in aid of the welfare of the blind were first made by the Ministry of Health. Pensions were then granted to all persons over 50 years of age who were "so blind as to be unable to perform any work for which eyesight is essential," while in 1920 the Blind Persons Act was passed which put these grants and pensions on a permanent basis. Grants through local authorities are now made at rates varying from 15*s.* to 27*s.* 6*d.* a week, and pensions to the blind who are over 50 years of age are provided by the State at the rate of 10*s.* a week. But unfortunately, even now, no uniform system of registration and certification of the blind is in force in England. The Ministry of Health have been endeavouring for a long period to persuade the local authorities to adopt a registration clause providing for the certification of the blind by a medical practitioner with special experience in ophthalmology, but in the summer of 1931 only 52 per cent. of the counties and county boroughs of this country had either formally or informally adopted this proposal. Further, many of these local authorities only fell in with the process of registration in respect of cases which were considered doubtful, and that is a matter where, except in cases where both eyes have been excised, it is unwise to leave decisions to the judgment of any but a skilled ophthalmologist. The committee's first recommendation, therefore, is that the employment of an ophthalmic surgeon should be made compulsory in every case before a blind person is put on the register as such. With regard to the grant of Old Age Pensions the procedure is somewhat different, but even here there exists no guarantee that the local pension officer may not decide the claim of an applicant without ever having had the opinion of a skilled ophthalmologist.

At present it is possible for a person to be put on the blind register by the local authority and to be refused a pension by the pension authority when he attains the age of 50, and vice versa. The second recommendation of the committee is, therefore, that the procedure for certifying blindness, both for the purpose of entry in the blind register and for the granting of blind Old Age Pensions, should be unified. It must be emphasised that the actual certification of blindness may be a matter of considerable difficulty, and up till now there has certainly been a lack of uniformity in the standard required by various authorities in interpreting the phrase "so blind as to be unable to perform work for which eyesight is essential." A circular issued by the Ministry of Health, not as a rigid instruction, but as a guide to the certifying surgeon, puts a visual acuity of 3/60 as a limit under which a person may *usually* be considered blind, while those with vision 6/60 or better cannot be considered blind unless there are other visual disabilities, and more especially a greatly contracted field of vision. Concerning those with vision between 3/60 and 6/60 the circular is indefinite, and it is evidently intended that in deciding on these difficult borderland cases a good deal should be left to the discretion of the certifying surgeon. In making their recommendations as to future procedure the committee have taken as a model the system recently introduced into Scotland, after having been for a few years in actual work in Glasgow. This system provides for the examination of every case by *two* experts, so that personal idiosyncrasy may be checked. For this purpose a limited number of clinics have been organised in the chief centres, while for outlying districts special arrangements have to be made. The clinic system is being used in Scotland to secure, in addition to the certificate, a statement of the cause of blindness, and with this purpose in view a form has been drawn up on which the results of the examination have to be stated in considerable detail. The committee recommend that this system should be adopted. Stress is laid upon the necessity of stating not only the condition of the eyes which involves blindness, but also its cause. Certain detailed recommendations are made with regard to the definition of blindness, with special reference to the borderland cases in which the visual acuity lies between 3/60 and 6/60; guidance as to what degree of defect of the field should be considered as a factor is given, while the age of the patient at the time, and not when the onset of "blindness" occurs must also be taken into account. Such directions should give much needed help in his difficult task to the certifying surgeon, while leaving him with a good deal of personal responsibility. The Scottish plan of requiring every certificate to be signed by two ophthalmic surgeons when possible is therefore specially to be commended.

Besides the form of certificate of blindness applicable to adults, suggested in the report, forms are framed of two certificates for children under 16. Here, for purposes of the Education Act, the definition of blindness now in use is "too blind to be able to read the ordinary school-books used by children," and these forms of certificate are framed for two purposes. First, their employment

[1] Report on the Certification of Blindness and the Ascertainment of the Causes of Blindness. Copies from the Secretary, Prevention of Blindness Committee, 68, Victoria-street, S.W. Price 1*s.*

would enable the education authorities to discriminate between children so blind that they can only be appropriately taught in a special school or class for *totally* blind children, from those who can appropriately be taught in a school or class for the *partially* blind. Secondly, those certificates would distinguish between those children who, when they attain the age of 16, are likely to be so blind as to come within the provisions of the Blind Persons Act, and those of whom this cannot be said. There is also a form of certificate meant to apply to those cases of partial blindness of a progressive character not yet blind enough to fall within the provisions of the Act but likely to become so at a later period. It is obvious that the information which these examinations and certificates are meant to elicit would be of value also in determining whether children with defective sight are more suitably educated in an ordinary school, a blind school, or a special school or class for the partially blind. It is also obvious that to obtain reliable information on all these points cases must be examined with care, knowledge, and skill. We therefore heartily commend this important report to the consideration of the authorities concerned.

MODERN HOSPITAL CONSTRUCTION.

THIS is not a time to contemplate with equanimity the demands of a community for a new hospital. In this country hospital beds are admittedly wanted, and badly wanted in many places, but, as far as possible, we must mostly rely upon modifications, annexes, and partial rebuildings and adaptations, even though the policy of providing a whole new hospital would be the best course. Indeed, it might be in the long run the more economical direction of effort, but the general financial position does not allow of the expenditure of large sums to-day in order that still larger sums may be saved later. To many, therefore, it may seem inopportune just now to call attention to the modern principles of hospital construction, but there are reasons for the other view. First, we can contemplate the ideal and learn lessons for the future without the temptation to spend; and, secondly, we can from scrutiny of the latest manners in hospital construction derive valuable lessons for procedures of renovation.

The last issue of *Nosokomeion*, published in October, 1931, contained a series of articles on modern hospital construction by leading specialists in England, America, France, Germany, and Italy. These show in a most suggestive fashion that fundamental changes in hospital planning have been taking place recently upon American models. And though the details of structure vary with the architectural tendencies of each country certain common principles have been evolving. The pavilion system which long remained the standard type is no longer followed in an invariable way. The ward units are more often placed vertically one above the other, rather than side by side as formerly. The sanitary tower is also disappearing though it had many architectural advantages. Taller buildings, smaller wards, larger window space, and a more ample provision of balconies are among the more obvious changes noticeable in modern hospitals. They have been brought about by a desire for efficiency and economy expressed by a more compact plan and a more concentrated arrangement of the engineering services, and they take note, inter alia, of such different things as modern views on cross-infection, the desire for greater privacy and comfort for the patients, and safety as evidenced in new methods of fireproof construction. In all these things no doubt the influence of American hospital planning has been a powerful factor in bringing about changes in European countries. For example, the Columbia-Presbyterian Medical Centre in New York City, an illustrated account of which was published in a special supplement to THE LANCET,[1] is echoed in France by the designs for the Hospital at Clichy. But in this building the balcony projection on the cantilever principles has been made a strong feature of the design, particularly on the tenth and eleventh storeys where it is continuous. These two top storeys not only form an effective horizontal line to the top of the building but provide open-air lying-space for tuberculous patients. The balcony principle has been carried a step further in another French example, the hospital at Colmar, where the terrace type of balcony has been employed in an ingenious way. The storeys are set back one behind the other on the south side to provide balconies for the patients, but the building has only six storeys making no attempt to "sky-scrape"; to employ usefully the width of the lower floors, a series of overhangs have been built. This was made possible by using reinforced concrete and shows that in times to come the architects of hospitals must take this form of building into consideration. Many of the points mentioned appear in graphic illustrations and ground plans which are reproduced in this journal, but the chapter in *Nosokomeion* on German hospitals is not illustrated. This is unlucky for some of the most interesting of modern hospitals have been erected in that country. But as Herr v. A. LOMMEL, the writer of the chapter points out, the present economic crisis may result in a central corridor type of plan. But it is to be hoped that the small ward, facing south and opening off a north corridor, will continue in favour. Many of the changes in hospital construction to which attention has been drawn are well illustrated in the designs for the new Freemasons' Hospital, at Ravenscourt Park, of which an excellent sketch plan appeared in the *Times* on Wednesday last.

In England among the most interesting developments noted in the hospitals selected for notice is the increased use of the type of ward in which the beds are placed parallel with the walls, with glazed metal screens separating the heads of the patients. Mr. C. E. ELCOCK, who is responsible for the chapter on the present position of hospital construction in this country, describes and illustrates the variation of this type which he names the

[1] THE LANCET, Jan. 5th, 1929.

"verandah" ward (because no verandah is required), with large horizontal window spaces. The right proportion of window space to wall space is largely a matter of opinion, but we should ourselves consider it important to avoid very large windows except towards the south. The lively interest taken in hospital planning in Europe and America and the evident desire for new ideas in architecture to keep pace with progress in medical science must be welcomed as signs of healthy activity. But modern hospital planning has changes, almost revoluntionary in character, to be prepared for. The increase in special classes of patients and the probability that sooner or later rich and poor will, to an increasing extent, be treated under one roof, on some graded principles of fee, demand variety and flexibility of planning. The treatment of out-patients in special departments will affect the hospital planning of the future radically, and the need for expansion in these directions must necessitate ample open space round any new hospital buildings. With regard to this point past history and present circumstances show only too clearly the folly of producing a cast-iron plan with all spaces allocated. There is much to think about, and it is to be hoped that thought will be taken during the breathing space enforced upon us by poverty. The time will come; let us be ready.

COMPLICATIONS OF TONSILLECTOMY IN CHILDHOOD.

THE convalescence of children after the removal of tonsils and adenoids is usually uneventful, but the complications of an operation so frequently performed must necessarily reach a considerable total. Of these, hæmorrhage, reactionary and secondary, is the most common, but others also are important, as Mr. J. A. KEEN [1] shows from his experience of 9344 such operations performed by him at the Leicester school clinic during a period of ten years. In the first place, as he points out, the various sequelæ cannot, of course, always be connected directly with the operation. Tonsillectomy is performed throughout the year, irrespective of season or weather; many of the children come from, and quickly return to, overcrowded homes, and have attended school on the day before operation, where they are subject to infection with colds and with the infectious fevers. On the whole, therefore, it is surprising that more children do not have some disturbance of convalescence, and operations must occasionally be performed on those who are sickening for some infectious illness. This point is well brought out by Mr. KEEN'S figures of the incidence of the acute specific fevers after the tonsil and adenoid operation which are as follows: diphtheria 3, measles 4, mumps 2, whooping-cough 1, and chicken-pox 7, with 5 doubtful cases of scarlet fever, and 18 cases of scarlatiniform rash. All three cases of diphtheria were of a severe laryngeal form, and two of the patients died. In these, as in other types of infectious fever, there is probably no direct relationship between the disease and the operation, but scarlet fever stands in a different category. A difficulty here is that we may have to deal with the so-called "surgical scarlet fever," which is perhaps not true scarlet fever at all. In Mr. KEEN'S series 18 patients developed a fleeting scarlatiniform rash, usually with a slight rise of temperature, on the second or third day, and he believes that such rashes are not very uncommon after this operation, for they are easily overlooked in the absence of a routine follow-up of cases. In addition, five of his patients were sent to the isolation hospital by their own doctors with the diagnosis of scarlet fever; he analyses these cases and comes to the conclusion that they were not true scarlatina but surgical scarlet fever, appearing on the second or third day after operation, of a mild type, and not infectious to others. He believes that this condition is due to infection by some other strain of the streptococcus group but not by that of true scarlet fever. It is noteworthy that the healing of the wounds in the throat is not delayed.

It is otherwise with post-operative septic complications, which in a mild form are not uncommon; here the inflammation does not remain superficial and strictly localised, but spreads to the soft palate or pharynx with delayed healing and more or less severe toxæmia, and later with excessive formation of scar tissue. Mr. KEEN estimates that at least one child in every 20 or 30 has some delay of convalescence of this nature. Generalised sepsis, or septicæmia, is fortunately rare, but he encountered five cases in this series with one death; inflammation of the ears or lungs may occur as complications, but the main disease is a generalised infection. Cervical adenitis is not very unusual; when glands were enlarged before, they often become larger after operation, though this is quite temporary; but acute swelling of glands not previously enlarged may also occur, accompanied by a sharp rise of temperature. There were five cases of this kind in the series, and all subsided without suppuration. Of pulmonary complications, all, amounting to 23, were instances of lobar pneumonia, bronchopneumonia, and acute bronchitis. The throats showed no exceptional sepsis and healed in a normal way. A fact of interest is that the seasonal incidence was the same for the summer as for the winter months, but the children are kept in the clinic for 24 hours after operation. Mr. KEEN thinks that the development of these acute pulmonary infections may be explained by the possibility that the operation is performed during the prodromal stage of an infection. He rules out irritation of the bronchial mucous membrane by the anæsthetic on the ground of the short administration, which averaged under four minutes, and he considers that this complication cannot be caused by inhalation of blood or septic material, because the operation is a very quick one with the guillotine, the head is kept in the extended position during the manipulations, and the child is turned on to the side immediately afterwards. It will probably not be universally agreed that even these factors are sufficient to prevent altogether

[1] Jour. Laryng. and Otol., January, 1932, p. 1.

the aspiration of material from the throat during operation; the experiments of MAY, THOBURN, and ROSENBERGER,[2] by radiography after the instillation of iodised oil, seem to show that some degree of aspiration is the rule, but that elimination is very rapid. Aspiration is a probable cause of pulmonary abscess, but of this there was no case in the series, and Mr. KEEN'S suggestion is a likely one that an infection, already present, was aggravated by the trauma of operation.

Acute suppurative otitis is an important complication, of which there were 60 cases in this series of 9344 operations, besides seven cases of recurrence of a previous otorrhœa. Among these 60 patients were six extremely serious cases of mastoid and intracranial complications with three deaths. These figures are in accordance with the general opinion that acute suppurative otitis is exceptionally virulent when it occurs as a complication of the tonsil and adenoid operation. As referred pain in the ear is frequent, and must be distinguished from true otitis, Mr. KEEN wisely writes of the advisability of removing cerumen before the operation, and he also mentions the harmful effect of letting cold water get into the ear while sponging the face after operation. In his series the infection occurred in the right ear in 37 cases, and in the left in 15, and he found that nearly twice as many children lay on their right side than on their left, thus facilitating the infection of the right Eustachian tube. Incidentally this finding points against damage by cold water, for patients are usually turned on to the right side after the operation. Mr. KEEN also encountered five cases of glottic spasm, three on the operating table and two in bed but before coming round from the anæsthetic; they appear to have been severe, for laryngotomy was performed in one, and on two of the others an incision was begun before the glottis relaxed. This does not agree with the contention that no blood can be aspirated during the operation, for the spasm is almost certainly caused by its entry into the larynx. There was also a very unusual case of subcutaneous emphysema, apparently caused by glottic spasm and alveolar rupture, on the day following operation.

[2] Jour. Amer. Med. Assoc., 1929, xciii., 589; see THE LANCET, 1929, ii., 784.

ANNOTATIONS

THE COST OF ENGLISH MORALS.

To the lay observer the outlook of the medical profession sometimes exhibits a puzzling mixture of realism and conventionalism, of originality and orthodoxy, of courage and of timidity. This mystifying compound is noticeable in some specialities more than in others. In the specialty of venereology, the outlook is predominantly realistic; here the principles of treatment are adjusted to situations which exist rather than to those which ought to exist. With regard to the principles of prophylaxis, however, medical opinion is—or at any rate was only a short time ago—less unanimous, and was undoubtedly influenced by the different expressions of lay morality. In psychiatry, there prevails a distinctive outlook in such matters as criminal responsibility and the sexual perversions. In relation to certain topics of obvious medical significance, the main body of medical thought is held by some to follow timidly behind an advance guard of lay opinion. There has probably never been an age in which current ideas on sexual questions have been more heterogeneous, fluctuating, and uncertain than the present. The problems of divorce, of regulation of parenthood, of sex education, of preparation for marriage, all of which, in the wider sense, have medical significance, are freely discussed in the press and in popular lectures. Yet medical opinion upon them remains uncrystallised if not actually chaotic. "In regard to these things," writes Sir Thomas Horder in a cautious yet appreciative introduction to a book dealing with these subjects, "there is in England a tremendous and not uncharacteristic inertia." The book, entitled "The Cost of British Morals,"[1] is a forcible and eloquent expression of "advanced" lay opinion. Mrs. Chance's central theme is that the veil of silence which, during the last century, enshrouded all that pertained to human reproduction—a silence which the scientific spirit is now only beginning to penetrate—has cost us much avoidable suffering. In successive chapters she gives illustrations of the timidity both of the medical and lay approach to the problems of sexual physiology, sexual education, birth control and abortion, and she points to the sacrifice of happiness which this attitude carries in its train. The book is an energetic and convincing plea for enlightened investigation, which should provoke discussion and will be read with profit by many.

[1] London: Noel Douglas. 1931. Pp. 127. 5s.

PERIPHERAL VASCULAR DISEASE.

Now that many peripheral lesions, the result of vascular occlusion, may be relieved by surgery of the sympathetic nervous system, it is becoming increasingly important that those lesions due to vasomotor spasm should be easily and clearly differentiated from those in which the underlying pathological condition is an obliterative disease of the artery and it is useless to hope for improvement from operation. W. J. M. Scott and J. J. Morton[1] find that it is possible to gauge the part played by sympathetic vaso-constriction, and thus foretell the probable results of sympathectomy, by means of anæsthesia. They show that under deep general anæsthesia or under spinal anæsthesia the sympathetic fibres are paralysed and a uniform degree of vaso-dilatation is produced all over the area anæsthetised—that is, of course, assuming that the vascular supply of the area is intact. As a result of this vaso-dilatation the skin temperature rises in normal subjects, at room temperature of 20° C., to at least 31·5° C. (88·7° F.). If the vessel supplying the part is occluded by a structural defect there is vaso-dilatation and no rise in skin temperature, while if the obstruction is partly spastic and partly organic the temperature rises but does not reach the normal level. Closely similar results are obtained by using a local anæsthetic to block the peripheral nerves supplying the part, but the rise in temperature is about 1° C. below that reached with spinal or general anæsthesia, since those sympathetic fibres reaching the vessel higher

[1] Arch. Int. Med., December, 1931, p. 1065.

up the limb are left unanæsthetised. By this method Scott and Morton find it easy to assess the degree to which the vascular obstruction will be relieved by sympathectomy and thus to choose their cases for operation with more success. P. G. Flothow [2] has obtained similar results, but he prefers to inject the sympathetic ganglia supplying the affected part with a local anæsthetic. By this method he claims that not only are all the sympathetic fibres eliminated but that also the degree to which pain will be relieved by operation may be prejudged. It is stated that the technique of these injections is simple and that they cause little discomfort.

REGENERATION OF THE UTERINE MUCOSA AFTER DELIVERY.

THE involution of the puerperal uterus is one of the most remarkable processes met with in the body. It leads in the short space of six weeks to the reduction in size of the uterus from that of an abdominal tumour extending nearly to the level of the umbilicus at the end of the third stage of labour to dimensions which differ very little from those of the virgin uterus. The process is of necessity complex and much of it is but little understood. Histological investigations are handicapped by scarcity of material, for it is only rarely that uninfected specimens are obtained. The involution of the muscle-fibres consists of a granular atrophy without fatty degeneration and there is no evidence that individual fibres are absorbed. The involution of the vessels is difficult to interpret, and at the present time the contradictory views of Goodall [3] and Wilfred Shaw [4] are disputed. More is known of the regeneration of the mucous membrane of the uterus, for Teacher's [5] contribution in 1927 cleared up some of the difficulties. The late Prof. Whitridge Williams [6] shortly before his death called attention to the involution of the placental site and based his views upon the study of eighteen uninfected puerperal uteri. It is well known that the placental site is sometimes difficult to identify immediately after delivery, but within a few hours, probably owing to the relaxation of the uterus, its sinuses become engorged with blood. The sinuses become thrombosed and are then readily recognised by their vascularity; moreover the placental site projects above the general surface of the lining membrane of the uterus. Involution of the placental site proceeds until by the end of the sixth week after delivery the endometrium lines the mucous membrane of the uterus completely, and macroscopical examination reveals little trace of the situation of the placental site. The mechanism of the renovation of the rest of the endometrium is relatively simple. The line of cleavage between the membranes and the uterus is through the spongy layer of the decidua, and after expulsion of the placenta and membranes a raw area remains which oozes blood and serum. The superficial part of this zone becomes infiltrated with leucocytes, and by necrosis the remnants of the spongy layer are shed to form part of the lochial discharge. The cells of the basal layer of the glands then grow over the denuded area in a way which is comparable to the process of repair after menstruation. The most striking feature of the renovation is its rapidity, and Whitridge Williams was able to confirm the accepted view that involution of this part of the endometrium is completed by the third week of the puerperium. The involution of the placental site zone is, as might be expected, much more intricate, and six weeks elapse before the placental site is covered by endometrium. Whitridge Williams showed that leucocytic infiltration and necrosis can be demonstrated in the superficial layers in the first two weeks of the puerperium, and that this zone is shed in a way similar to that obtaining over the rest of the endometrium. The thrombosed sinuses and vessels develop hyaline tissue in their walls and are reduced in size partly by subendothelial proliferation and partly by absorption of the hyaline tissue. The main point of Whitridge Williams's thesis is that the bulk of the placental site is actually exfoliated during the fourth and fifth weeks of the puerperium. Exfoliation is produced as a result of the activity of the adjacent endometrium which undermines the placental site and detaches it from the wall of the uterus. This mechanism is assisted by the hypertrophy of the fragments of the basal layer of the endometrium which lie between the placental site and the wall of the uterus. The evidence which is brought forward is fairly convincing, and the only difficulty in accepting the explanation is that there is not a characteristic uterine discharge at this phase of the puerperium. It is interesting to notice that the only previous observations on the puerperal uterus which suggest a similar mechanism are those of Ries which were published some forty years ago. The histology of the involution of the puerperal uterus is worth further study.

[2] Amer. Jour. of Surg., December, 1931, p. 591.
[3] Goodall, J. R.: Studies from Royal Victoria Hospital, Montreal, 1910, ii., No. 3.
[4] Shaw, Wilfred: Jour. Obst. Gyn. Brit. Emp., 1929, xxxvi., 1.
[5] Teacher, J. H.: Ibid., 1927, xxxiv., 1.
[6] Williams, Whitridge: Amer. Jour. Obst. Gyn., 1931, xxii., 664.

CARDIOLOGICAL DIAGNOSIS.

Two useful pamphlets [1] have recently been published by the heart committee of the New York Tuberculosis and Health Association. They deal with the criteria for the interpretation of electrocardiograms, and with radiological diagnosis in heart disease. One of the principal objects of the Association is to achieve a standard nomenclature and thereby render comparable the results obtained by different workers. Such uniformity would also facilitate the study of cardiological problems from the statistical aspect. In the pamphlet dealing with electrocardiography 50 variations in the form of the record are described. Of these, 27 are concerned with the heart's rhythm, three with deviation of the electrical axis, and the remainder with the form of the different deflexions which constitute the auricular and ventricular complexes. The list of phenomena considered includes all the common deviations from the normal, and the only feature which might, perhaps, be regarded as an unnecessary refinement is the subdivision of the duration of the Q R S complex into three (short, medium, and long) instead of the usual two types (less than and greater than 0·1 sec.). The pamphlet is illustrated by a series of typical records. The pamphlet on Radiologic Diagnosis in Heart Disease opens with a simple and lucid account of the methods of procedure. It then deals with the diagnosis of enlargement of the various cardiac chambers and of the aorta, stress being laid on the fact that it is much more important to ascertain which chambers of the heart are involved rather than to obtain an exact measurement of the size of the whole heart. In place of actual radiograms a series of 31 line diagrams are

[1] Criteria for the Interpretation of Electrocardiograms. Guide to Radiologic Diagnosis in Heart Disease. New York Tuberculosis and Health Association. 1931.

given. These serve to illustrate clearly the various features described in the text. In the preface Dr. Alfred E. Cohn points out that this is merely a tentative effort at classification, and necessarily incomplete; but that the authors are to be congratulated on producing such a helpful introduction to a difficult subject.

THE TREATMENT OF PRURITUS SENILIS.

THE ætiology of pruritus senilis is frequently obscure. It is not an uncommon symptom, and is one of the most lamentable and intractable of the penalties of old age. The hypothesis of essential skin changes of a degenerative type, with loss of elastic fibres, is no longer tenable, for the large majority of individuals with senile atrophic skin do not have pruritis. It is essential in every case to exclude such obvious causes as pediculi, cystitis with an enlarged prostate, strictures, and latent carcinoma, especially of the liver. Dr. H. Abelson,[1] of Leipzig, believes he has established another factor in a metabolic undernourishment of the cutis due to senile changes in its circulation—i.e., a cutaneous arterio-sclerosis. For many years he has always given iodine to such patients with benefit, and for the last six months has obtained encouraging results with a skeletal muscle extract—lacarnol. This drug—the main indication for which is angina—is quite harmless, and is prescribed in drop doses on sugar, up to 12 or 15 drops t.d.s. In eight of Abelson's cases there was so much improvement in a week that the patients are stated to have forgotten to apply local antipruritics. Further benefit was obtained by 1 c.cm. injections hypodermically twice a week. This group of cases and three more were completely cured of itching in four weeks, but in a third group of 12 cases this happy result was not secured, and the patients had to continue to seek relief by local measures after a six weeks' trial of lacarnol. The element of suggestion cannot easily be excluded, especially in such a small series of cases, but the good results in nearly half the cases suggest a trial of this method.

PRIMARY CARCINOMA OF THE LUNG.

THE recent increase in the number of cases of primary carcinoma of the lung may not be real, but certainly more cases are being reported. Dr. B. M. Fried, in a clinical and pathological study,[2] states his opinion that the increase is due to more accurate diagnosis, the fact that attention has been focused on the condition, and an increase in the span of human life. Though this is a comforting suggestion, autopsy reports from the large hospitals cannot be ignored. James Maxwell from London, J. B. Duguid from Manchester, W. Kikuth from Germany, and C. V. Weller from America, and other workers report a definite and steady increase in the percentage of carcinomata of the lung seen at autopsies, and also an increased proportion in relation to the total number of malignant growths. Maxwell notes that "the thorax is assuming increasing importance as a primary site of malignant disease." Dr. Fried reviews again the possible ætiological factors that have been blamed, such as influenza, tarred roads, tuberculosis, syphilis, and trauma, but has to reject each in turn. If more space in the literature on bronchial carcinoma were given to diagnosis, especially early diagnosis, and less on histogenesis and metastases, the average medical reader would be grateful. Dr. Fried is not very helpful in this respect, but he does add one new idea of importance. He suggests that bronchial carcinoma frequently runs a protracted course, often of several years' duration, during which time the patient's symptoms suggest only a mild inflammatory disease of the bronchi. In Dr. Fried's view, practitioners are so obsessed with the terminal picture of this disease as seen in the post-mortem room that they are inclined to forget the onset: that two years before their patient started having bronchitis and that his sputum was occasionally streaked with blood. The difficulty facing the practitioner is that if he is to make an early diagnosis he must subject the patient to special examination, such as bronchoscopy and X rays, at a time when the complaint is only of what may appear trivial pulmonary symptoms. To wait nowadays for physical signs to develop before making a diagnosis of pulmonary tuberculosis is to deny to the patient the best chance of recovery; and this is true, also, of pulmonary cancer.

Directly opposed to the theories of Dr. Fried are those of Dr. Jacob Polevski.[3] He maintains that primary cancer of the lung can be diagnosed clinically by the characteristic history and physical signs, that fluoroscopy is of great aid in doubtful cases, but that bronchoscopy and biopsy are rarely necessary. This expectant attitude can hardly be justified, since progress cannot be anticipated unless active steps are taken to ensure early diagnosis. Dr. Polevski reports nine cases, all of which showed on the X ray a shadow extending out to the periphery of the lung. This is, unfortunately, the stage at the time many patients seek advice, but the absence of such pronounced signs by no means excludes cancer. Primary cancer of the lung originates in the bronchial mucosa near or around the hilum of the lung. X rays will not show any abnormal shadow until the growth has spread into the surrounding tissue, or, what is more frequent, has grown into and obstructed the lumen of the bronchus, causing atelectasis and pneumonitis in the obstructed area of the lung. It is only with the bronchoscope that we can hope to see the beginnings of this disease. Chevalier Jackson has so popularised bronchoscopy in the United States that the practitioner does not hesitate to recommend it to his patient any more than he would hesitate to advise cystoscopy in an obscure case of hæmaturia. More bronchoscopic clinics are needed in England, though it must be confessed that even with an early diagnosis the outlook is still gloomy. X ray therapy can offer only palliative treatment, while radium and partial pneumectomy are still in the experimental stage. The results of these are sufficiently encouraging to offer at least a slight hope for the future.

HEALTH OF THE ARMY IN 1930.

THE report[4] on the health of the Army in 1930, signed by Lt.-Gen. Sir H. B. Fawcus, Director-General, Army Medical Services, registers further advances in the struggle for scientific recognition, treatment, and prevention of disease in the Army. The report is concerned with 10,972 officers and 178,384 other ranks. The figures of illness which it records are nearly all lower this year, probably because there was no considerable outbreak of influenza in 1930. The admissions to hospital per thousand were 428·4 (468·5 in 1929), deaths 2·32 (2·45), finally invalided 9·28 (10·1), and constantly sick

[1] Dermat. Woch., 1931, xcii., 1775.
[2] Medicine, 1931, x., 373.
[3] Arch. Intern. Med., 1931, xlviii., 1126.
[4] H.M. Stationery Office, 1932, pp. 151, 2*s.* 6*d.*

24·1 (26·12); the numbers of out-patients were also less, 2524·9 daily (2742·6). Among the chief causes for admission to hospitals were digestive diseases other than those of liver and tonsils 55·1 (55·4) per thousand, injuries 52·8 (52·1), malaria 41·3 (41·2), inflammation of areolar tissue 34·5 (34·7), venereal diseases 34·5 (35·0). The admissions for dysentery, sand-fly fever, and scabies showed a slight increase; for influenza, enteric fever, pulmonary tuberculosis, and pneumonia there was a slight decrease. The final invaliding rate was 9·28 (10·1). The chief loss of service is through gonorrhœa. The death-rate of women is raised, apparently by increase in deaths from diseases of the generative system. Mother and child welfare committees are formed in all large stations and are credited with excellent work. The slight increase in dysentery is thought to be due to better diagnosis of cases formerly returned as colitis or diarrhœa. In India some 80 per cent. of cases of dysentery are bacillary, but in Shanghai amœbic are the more numerous. Some epidemics of enteric fever are thought due to ambulant, unrecognised cases, perhaps styled "P.U.O." The prevention of malaria in Shanghai has been difficult. The huts are on Chinese ground, surrounded by canals; the municipality oiled these, but the smell of the oil caused complaints from the neighbours. Dusting with Paris green was the method then tried, but the neighbours' ducks ate that and died. Insect-eating fish were next procured, in the hope that they would eat the larvæ, but this was a vain hope, for the ducks and their owners made joint onslaughts on the fish. Meantime malaria in the force at Shanghai has trebled. It looks as if the huts there will have to be mosquito-proofed. Screening of barracks proceeds in India, but only slowly. Plasmoquine is being tried and is giving satisfaction; in one group of 233 cases there were only five relapses. The case-mortality of pneumonia is the same as it was forty years ago (10 per cent.). There is much less invaliding for middle-ear diseases since electrically lighted otoscopes have been supplied to recruiting medical officers. There were removed from knee-joints 238 internal, 28 external semilunar cartilages, and all the patients returned to duty. Two cases of cysticercosis are reported, and several of oriental sore occurred at Quetta. The care with which the physical training of the recruit is conducted deserves every praise. To test the effect of tobacco-smoking on endurance, a three-mile run was held among 1885 men in 19 races; of the non-smokers 18·7 per cent. got into the first ten places, of the moderate smokers 8·4, of the heavy smokers only 6·2. It is said that practically all recruits are total abstainers. Tuberculosis continues to cause permanent loss to the service, 231 cases, with 31 deaths, 200 finally invalided, the percentage increasing with age and service. Bacteriological examinations are proving more and more effective as aids in diagnosis and treatment in the Army, and this fact provides one of the most encouraging features of this interesting report.

PATHOLOGY OF ENDOTHECAL INJECTION.

LITTLE is known of pathological changes which may be caused in the spinal cord by injections for spinal analgesia. It is true that now and then reports appear of neurological symptoms attributed to endothecal injections, but these are extremely rare, and actual post-mortem evidence of spinal cord damage is rarer still. Experimental proof of changes brought about in the nervous tissue of the cord when endothecal injections were made in dogs is now provided.[1] The authors describe and figure changes in the ganglion cells of the grey matter of the cord similar to those seen in Wallerian degeneration, swelling and fragmentation of axis cylinders, and signs of degenerative changes in the tracts of the cord. The dogs were killed at various periods, and after injections of various strength. The investigators point out that the last of these changes were not pronounced in cords of animals allowed to live for 90 days. It is possible that all the changes described were transitory. We anticipate with interest the fulfilment of the authors' hope that their studies may be extended to the cords of human beings, and the results incorporated "with those clinical observations which have been made in careful neurologic examination of patients operated on under spinal analgesia."

THE DECLINE IN THE MORTALITY FROM TUBERCULOSIS.

THE mortality from tuberculosis has been declining steadily in this country since 1866, with one notably exceptional period during the war years. As the Registrar-General's annual reports show, the standardised death-rate from all forms of tubercle for the decennium 1851–60 was 3478, while in 1929 it was 932 per million of the population. The corresponding figures for the pulmonary form of disease were 2772 and 738. The fall in the death-rate from non-pulmonary tuberculosis has not been so continuous as that observed for the pulmonary form, lagging till 1891 and then dropping with remarkable acceleration during the succeeding twenty years. So far as existing records reveal the true state of affairs, there appears to have been no decline in the curve between 1855 (when registration commenced) and 1866. Judging from the available information it may be conjectured that there was probably a rise in mortality from tuberculosis in the first half of the nineteenth century, concurrently with the increase in the general mortality-rate which seems to have occurred during that period.

At a meeting held on Jan. 15th the Society of Medical Officers of Health discussed the causes of these phenomena. The subject was introduced by two officers engaged in the tuberculosis service, Dr. Lissant Cox in Lancashire and Dr. E. Ward in Devonshire, their respective areas differing considerably in character and population. There was little difference of opinion on the broader aspects of the question either between them, or among most of the subsequent speakers. It seemed to be generally accepted that the raising of the standard of living, with consequent improvement of nutrition, was a prime cause of the decline of tubercle, and that reduction of overcrowding in houses, better sanitation, improved habits of cleanliness of the people as the result of better education, better working conditions, and improvement of the milk-supply were among the reasons for the fall in mortality before specific schemes for the prevention and cure of tuberculosis came into action. It was not forgotten that segregation of the advanced case, and therefore the limitation of mass infection, came into play long before the National Insurance Act of 1911, and the Tuberculosis Regulations of 1912 inaugurated the tuberculosis schemes of county and county borough councils; the steadily increasing hospital accommodation of the guardians was being extensively utilised for this purpose. Hardly a doubt was raised about the value of the now

[1] Davis, L., Haven, H., Givens, J. H., and Emmett, J.: Jour. Amer. Med. Assoc., Dec. 12th, 1931, p. 1781.

well-established schemes of early diagnosis, surveillance of contacts, specific forms of treatment in and outside of sanatoriums, hospitalisation of the advanced cases, and education of patients in methods of preventing the spread of infection. There is, indeed, some evidence that the death-rate has fallen more rapidly in recent years in those towns which have made the most extensive institutional provision. The continued application and perfection of these measures is a commitment of modern civilisation, but their actual share in the cause of the decline of mortality of tuberculosis is difficult to detect, as Prof. E. L. Collis pointed out. Indeed, there were murmurs of assent when Sir StClair Thomson asked whether tuberculosis might not be dying out of its own accord. This is perhaps really a suggestion that sudden migrations and increases of population such as occurred one hundred years ago, followed by relative stabilisation of town and country stocks and a falling birth-rate, may have had more to do with the rise and fall of tubercle than the less definitely social considerations which bulk large in the medical mind. It is at least gratifying to observe that the decline has continued with hardly any arrest of the rate of acceleration (except in the case of pulmonary tuberculosis in females aged 15–20 years) during the past ten years of increasing financial embarrassment.

BRILLIANT GREEN FOR SYCOSIS.

A SIMPLE and cheap method of treating sycosis has recently been described by Prof. Senin (Nijni-Novgorod)[1] which, if the results recorded are confirmed, will revolutionise the treatment of one of the most intractable of all dermatoses. All crusts and scales are first removed by maceration with a 5 per cent. salicylic ointment. Epilation of loose pustule-encircled hairs should follow, and then the affected areas are conscientiously painted every day or every other day with a 1 per cent. alcoholic solution of brilliant green in 70 per cent. alcohol; 53 cases were cured after 12–25 applications of the solution. There were no relapses after a year, and a fair proportion had been treated previously without much result by X rays, vaccines, and other accepted procedures. Such results transcend the most optimistic of any yet reported, and as brilliant green has no toxic properties it will doubtless receive universal trial, in spite of the temporary inconvenience occasioned by its colour. In this country it has often been recommended for ulcers of the leg, and in ecthymatous conditions generally, and its bactericidal qualities have recently been tested by Dr. L. P. Garrod.[2] He found, from in vitro experiments, that the bactericidal action of brilliant green compares very favourably with that of most antiseptics, with the notable exception of iodine; and that its bactericidal action in the presence of 5 per cent. of blood greatly exceeds that of iodine. The conclusion he draws is that the value of iodine as a sterilising agent for a bleeding surface is overrated, and he goes so far as to suggest that it should be replaced for routine prophylactic use in the first treatment of wounds by the emulsion forming coal-tar germicides. Dr. Garrod believes that the proper treatment of a skin injury which is likely to be infected (such as a cut, scratch, or puncture accidentally inflicted during a septic dressing, operation, or autopsy) is the application either of acriflavine or rivanol, or of one of the highly germicidal dyes, such as crystal violet or brilliant green. In the case of punctured wounds (pinpricks or stabs by a scalpel point) he recommends the injection of the germicide with a syringe. He states that the combination of these two dyes known as "blue paint," which was recommended for obstetric and gynæcological use by Mr. Victor Bonney and Prof. C. H. Browning as long ago as 1918, has a bactericidal action in short periods greatly exceeding that of any other agent tested.

[1] Dermat. Woch., 1931, xcii., 1729.
[2] St. Bartholomew's Hospital Reports, 1931, lxiv., 85.

CANCER IN AMERICAN EX-SERVICE MEN.

Dr. Philip B. Matz, in the United States, has made a study of cancer in veterans from the world war, the Spanish-American war, and various expeditions.[1] He finds that only 16·3 per cent. of those affected gave a hereditary or familial history, but the smallness of this proportion, he thinks, may be due to the fact that most of the ex-Service men have not yet reached "the cancer age." The most frequent sites of disease were the skin, lip, stomach, lymphatic glands, rectum, buccal cavity, and bladder. The most frequent histological types were adenocarcinoma, basal cell carcinoma, and squamous cell carcinoma. The mean age of the whole group at the time of onset was 45 for carcinoma and 36 for sarcoma, the youngest being 20 and the oldest 91. No correlation was found between weight and development of cancer. Of 48 cases of cancer of skin or mucous membrane, 25 were farmers or ranchers, exposed to actinic rays and the rigours of an outdoor life. In the whole group, 40 per cent. gave a history of previous irritations or chronic inflammatory process and 27·6 per cent. had had a pre-cancerous condition of some kind. The early symptoms were usually swelling, pain, ulceration, bleeding, or loss of weight, but pain was such an unimportant factor that many patients did not seek advice in the early stages. There was again a delay in diagnosis when they did seek medical aid, with the result that on an average they were treated for 29·7 months before they were diagnosed. Among 89 ex-Service men who died, the duration of illness varied from two months to 156 months, the average being 25·6 months. The average for carcinoma was 28·3 months and for sarcoma 18·2 months. These figures form an interesting contrast with those recently published by the Ministry of Health.[2] The London cases passed very rapidly from the first symptom noticed to efficient diagnosis, and the disease took a much more rapid course. The patients were on the whole, however, much older people.

[1] Med. Bull. Veterans' Assoc., 1931, vii., 1010, 1144.
[2] See THE LANCET, 1931, ii., 1417.

INDEX TO "THE LANCET," VOL. II., 1931.

THE Index and Title-page to Vol. II., 1931, which was completed with the issue of Dec. 26th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—A meeting of the fever hospital medical service group of this society will be held at 1, Upper Montague-street, London, W.C., at 4 P.M., on Friday, Jan. 29th, when Dr. E. W. Goodall will deliver a presidential address on Pre-bacterial Views of Infectious Diseases.—The maternity and child welfare group will hold a joint meeting with the Pagans, a group of pædiatricians, at the same address, at 8.30 P.M., on the same day. There will be a discussion on Future Policy with regard to Medical Staff Appointments in Child Welfare Clinics.

SPECIAL ARTICLES

MEDICINE AND THE LAW.

Alleged Personation of a Doctor.

George Edward Williams, the medical attendant who has been charged at Marlborough-street police-court with offences against the Dangerous Drugs (Consolidated) Regulations, was on Jan. 15th committed for trial at the Central Criminal Court. As indicated in a note on the case in our columns last week, further charges of a serious nature have now been outlined. It was alleged that he had falsely sworn that he was a registered medical practitioner when giving evidence at Clerkenwell county court last August. The managing clerk to a firm of solicitors stated that he had known Williams for about a year, and that Williams gave medical evidence in the county court in connexion with a case of suggested food poisoning; Williams had given his evidence in the name of George Edward Williams, with the qualifications M.D. Camb., M.R.C.S., L.R.C.P., D.P.H., and had claimed to have been practising as a doctor for 26 years. A clerk from the office of the General Medical Council said that the Dr. George Edward Williams whose name and address was in the register was Dr. George Edward Williams, of Rhostryfan, Carnarvonshire. The son of Dr. Williams, of Rhostryfan, said that his father, who practised in Carnarvonshire, was ill and unable to attend the court; the witness did not know the accused.

A further charge related to the making of a false statement for the purpose of obtaining a passport last September. A clergyman of Upper Marylebone-street said he had certified an application for a passport on behalf of the accused, who had described himself as a physician and surgeon, and had declared that there had been no change in his name. A detective-inspector stated that the accused had said to him: "I have been known as Williams for five years; as you know, my name is Flaxman."

The accused has reserved his defence, and bail has been allowed.

A Guaranteed Cure.

Advertisers who, to put money in their pockets, offer extravagant and ridiculous guarantees in respect of their goods, cannot complain if a customer occasionally takes them at their word. This happened in the recent case of Wood *v.* Lektrik, Ltd., which, if Mr. Justice Rowlatt's judgment is challenged in the Court of Appeal, is sure to find a place in the legal text-books as an illustration of various points of the law of contract. The defendant company advertised "New hair in 72 hours. Lektrik Electric Comb. Great news for hair sufferers. What is *your* trouble? Is it grey hair? In ten days not a grey hair left. £500 guarantee." Mr. Wood, the plaintiff, bought one of the advertised combs and followed the directions ("to get the full benefit you should use it for five minutes"). He used the comb night and morning and occasionally during the day at his office as well, but the guaranteed cure of his greyness proved a failure. He sued for his £500 and won his case, subject to a possible appeal. Some of the defendant company's points seem commercially rather cynical. Their first contention, that the so-called guarantee was a mere flourish, was rejected; the judge took it to be a serious statement. The second contention was an attempt to throw over their own advertisement as something framed by an advertising agency and not authorised by themselves. This slender defence was rejected also; they had paid the agency's bill and had never repudiated the advertisement, but had accepted the profit of whatever sales accrued therefrom. Thirdly, it was suggested that the guarantee of £500 merely guaranteed the repayment of the price of the comb (3*s.* 6*d.*) if the customer wanted his money back. It appeared that in other instances the advertisements had contained a coupon explaining this remarkable limitation; but, as there was no such coupon in the announcement which attracted Mr. Brown, the suggested limitation was inoperative. Next the defendants said there could be no valid legal contract if there was impossibility of performance. With unusual candour they adopted the position that their comb could really never do what the advertisement promised on its behalf. They correctly argued that no legal consequences arise if someone promises the impossible; but unfortunately the advertisement expressly precluded the idea of impossibility. The combs, it said, were used by all grades of society, including Royalty; "not one has failed to do everything we claim for it." Moreover, the advertisement contained a picture of a man living at Forest Hill with his statement that his hair was very thin and going grey, but on the tenth day the greyness had gone entirely; "that Lektrik comb of yours has done the trick." Lastly, the defendants alleged that the plaintiff had not used the comb properly and that anyhow he had not proved that he had not got fresh hair growing from the roots. The judge was unimpressed by these arguments also. He held that the comb had failed in its operation and that the plaintiff, having complied with the advertisement, had made a valid contract and was entitled to the guarantee of £500.

Mr. Justice Rowlatt is known as a judge who decides upon first principles, and is but little swayed by the citation of leading cases. There is, as it happens, a leading case on the law of contract—Carlill *v.* Carbolic Smoke Ball Company—which is closely parallel. Some 40 years ago, when influenza was a greater novelty, a firm advertised the merits of its carbolic smoke ball, and offered £100 to anyone "who contracts the increasing epidemic influenza colds, or any disease caused by taking cold, after having used the ball three times daily for two weeks according to the printed directions." Mrs. Carlill used the smoke ball for several weeks, but contracted influenza. She sued for her £100 and won. The defendants said there was no contract because the firm had not been notified of the acceptance of its offer. The court held that the case resembled that of a reward offered for the recovery of lost property—anyone who performed the condition must be taken to have accepted the offer without further ado. As in the comb case, the defendants said the advertisement was a mere puff which no reasonable person would take seriously. But the advertisement had announced that the firm had deposited £1000 with the Alliance Bank to "show our sincerity in the matter." The plaintiff's victory in the carbolic smoke ball case was upheld by a strong Court of Appeal. Lord Justice Bowen agreed that ordinarily the acceptance of an offer must be notified to the offerer, in order that the two minds may come together and a valid contract be formed. But a person who makes an offer can expressly or impliedly intimate that a particular mode of acceptance will suffice to make the bargain binding. If so, it is only

necessary for the person to whom such offer is made to follow the indicated mode of acceptance. The Lektrik comb case was perhaps not so clear a case as that of the smoke ball, where Lindley, L. J., had no doubt that there was "a distinct promise expressed in language which is perfectly unmistakable." Undoubtedly the purchasing public allows for a little licence in the language of advertisements; otherwise the Lektrik Company's liability might be colossal. A director of the company told the court that approximately a million of the combs had been sold, and only four persons had claimed the £500.

Heavy Damages for a Doctor.

At Pembroke Assizes on Jan. 14th damages for slander amounting to £5000 were awarded to Dr. J. H. Owen, of Fishguard, medical officer of health to the Haverfordwest Rural District Council, against Mr. Cyril Hugh Barham, of Letterston, a member of the Pembrokeshire County Council. An injunction was also granted restraining him from repeating the slander. Mr. Barham tried to justify what he had said, but the judge told the jury that there was no evidence justifying the slander, and no proof whatever had been put before the court, by the defendant, of the statements he had made. The jury, after a few minutes' absence, found for Dr. Owen, with the damages stated above. Mr. Chappell, K.C., Mr. T. Carthew, and Mr. G. C. Richards (instructed by Messrs. Le Brasseur and Oakley), on behalf of the London and Counties Medical Protection Society, Ltd., appeared for the plaintiff and Mr. Barham conducted his own defence.

MENTAL DISORDER IN SCOTLAND.

THE seventeenth annual report of the General Board of Control for Scotland covers the year 1930, the first in which the former duties of district boards of control and parish councils were exercised by the county councils and town councils. The Board finds that the new authorities are taking an active interest and that there is every reason to hope that the care of the insane and mentally defective will continue on progressive lines. As a rule the lunacy and mental deficiency functions have been referred to the public health and public assistance committee, either jointly (ten cases) or partly to each (39 cases). They have been delegated to the public assistance committee alone in five cases and to a joint public health and lunacy and mental deficiency committee in one case.

Work of Voluntary Societies.—In the old days the vote of the General Board of Control included a sum of £750 towards the work of the societies assisting and supervising mental defectives outside institutions. These societies are of the utmost value. Supervision is carried out tactfully and unobtrusively, and children notified as incapable of receiving further benefit from instruction in a special class or school are followed up, and helped, as far as possible, in daily occupation centres. The associations also keep in touch with children over 16 discharged from special schools and classes. The Board was anxious that the voluntary associations should not have their work hampered in any way under the new Act, and issued a special circular to town and county clerks stressing the importance of maintaining the work, on account of its value to the defectives and of the economy it effected to the local authorities in reducing the necessity for institutional treatment. The local authorities were urged to ask the Department of Health to pay their contribution to the voluntary associations out of the amount payable as the general exchequer grant. The response of the local authorities was not, however, satisfactory, and the Board made a scheme under Section 64 of the Act. The Board also expresses the opinion that local authorities should have specific statutory powers to provide day occupation centres for defective children.

The report includes a brief review of the treatment of the mentally afflicted in Scotland, stressing especially the introduction and development of hospital care and nursing followed by occupational therapy. The great improvement in physical health has undoubtedly played its part in the improvement in mental health. It must be admitted, however, that this improvement is not reflected in the table given in the report; it appears that the recovery-rate in the quinquennium ending 1864 was 37 per cent. and in those ending 1874 and 1884 it reached as high as 41 per cent., while in 1930 it was only 33·9 per cent. The death-rate likewise was 8·2 per cent for the five years ending 1864 and sank as low as 7·7 per cent. in the five years ending 1879. For 1930 it was 8 per cent. The report attributes this statistical anomaly partly to the increase in voluntary patients, for whom no statistics are available.

The Board lays considerable stress upon the importance of the factor of generous accommodation, measured in floor space rather than in cubic space, as contributing to the general health of patients. When asylum accommodation was severely congested during the war, the death-rate rose considerably and the recovery-rate dropped. The Board considers that each patient should have 30 sq. ft. of floor space in the day-room, 60 sq. ft. in the dormitory, and 90 sq. ft. in hospitals and single rooms. This standard is often found too high in institutions where economy has reigned, during the war and post-war years, while the number of patients has steadily increased. The Royal Asylums alone show a surplus of accommodation. In the district asylums there is little if any margin and often a serious deficit on the Board's minimum. The overcrowding is partly due to the presence of over 2000 mental defectives in asylums for the insane and also to the presence of patients who could quite satisfactorily be boarded out with suitable guardians or in less expensive types of institution. The Board hopes that the demand for asylum accommodation may be decreased, first, by putting these patients in suitable accommodation, and secondly, by increasing the number of observation wards in poor-law hospitals for the treatment of mild and incipient mental disorder without certification.

On Jan. 1st, 1931, there were 19,241 insane persons in Scotland, an increase of 182 during the year. Voluntary patients admitted during the year numbered 734 and there were 972 such persons under care on Jan. 1st. There were 1406 pauper and 71 non-pauper patients provided for in private dwellings with the sanction of the Board, a decrease of 60 on the previous year. The visitors report that these boarded-out patients are extremely well and tactfully treated, although some of the guardians are quite aged persons. The death-rate of these patients was 1·27 per cent., and there was only one case of tuberculosis among them all. They have the benefit of light work on the crofts and farms, and it appears to be certain that no patient is overworked except in domestic service. The system seems to be equally successful for the defective, except that these patients are apt to be unsettled as a result of ill-judged letters or visits from relatives and also as a result of seeing other persons being paid a wage or a dole. One defective actually applied for discharge from certificate in order that he might apply for Government relief! All the visitors urge that greater advantage ought to be taken of this eminently satisfactory method of care.

On Jan. 1st there were 3299 certified mental defectives on the registers of the Board, an increase of 225 on the preceding year. During 1930, 112 aided mental defectives were certified and placed under guardianship.

COASTS RESORTS CONFERENCE AT TORBAY.

A CONFERENCE of medical men and others interested mainly in the south-western coastal health resorts took place at the Paignton Palace Hotel from Jan. 15th to 17th, under the chairmanship of Sir Alfred Goodson. Many medical officers of health and practitioners from seaside towns in Devon, Cornwall, and Somerset took part in the meetings, Lieut.-Colonel R. H. Elliot, Dr. Fortescue Fox, and Dr. W. S. C. Copeman being present on behalf of the London Provisional Committee on Coast Resorts. The conference was largely attended and included representatives of the railway, hotel, and entertainments organisations, and those present seemed to be keenly alive to the importance of finding immediate means to unite in a common effort the various interests concerned. The merits and possibilities of the health and holiday resorts of the British coasts at all seasons were laid before the conference in a series of addresses.

The aims of the Provisional Committee, as set forth in the memorandum presented to the meeting at the Institute of Hygiene in London on Jan. 11th, were discussed and approved: These are as follows:—

1. To formulate the medical case for the British marine health resorts in the prevention and cure of disease, and to differentiate on a scientific basis the various regions and places of the coast.
2. To make this information known to the medical profession and the public.
3. To encourage due provision of medical requirements, such as diet-prescriptions, adequate open-air shelters, baths, and other treatment facilities, improved and reasonable hotel accommodation, and other amenities.
4. Whilst fully recognising the admirable progress effected by many municipal authorities and local medical associations on the coast in devising and providing such facilities, to coördinate and assist the efforts of these and other bodies, and where necessary to encourage the initiation of new work.
5. To consider the formation of a medical organisation which shall link together medical men on the British coast.
6. As soon as practicable to establish in London a Central Bureau for distribution of approved literature and for furnishing the necessary assistance, advice, and information to the public and to medical men—the British Spas Federation and other organisations responsible for the health resorts of the country to be invited to coöperate in the organisation of this Bureau.
7. To promote regional conferences in the various areas of the coast.
8. At the proper time, as may seem fit, to change the name and enlarge the scope of the Association (the British Coast Resorts Association), in coöperation with organisations representing the spas and other British health resorts.

Members of the Committee pointed out that no kind of medical or other organisation has hitherto been framed to make known the attractions of the outer ring of health and holiday resorts on the coasts of the British Islands; the spas were already organised. Other speakers emphasised the educational value of an organisation dealing specifically with the coast resorts, and of a permanent medical advisory body in London, and the need of a central bureau which should obtain the necessary medical data from the localities and collate and edit the material for the guidance of the profession and the public.

Many speakers drew attention to the need for improved and more reasonable accommodation at seaside places, also to the importance of abolishing the unnecessary restrictions which at present hampered their development.

The following resolution was unanimously passed:

"That this Conference considers it a matter of urgency that there should be formed a British Coast Resorts Association, and earnestly recommends to the Committee appointed at the meeting held under the chairmanship of Lord Riddell at the Institute of Hygiene, on Monday, Jan. 11th, 1932, that it should proceed to its establishment with the least possible delay."

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

PROGRESS OF PUBLIC HEALTH.

THE report of the Department of Local Government and Public Health of the Irish Free State for 1929–30, recently issued, records a steady and satisfactory progress as regards activities bearing on health. The death-rate was 14·59 per 1000 of the population as compared with 14·84 for the preceding decade. The highest death-rates were in the county boroughs, the lowest in the almost purely rural areas. The death-rate from the principal epidemic diseases in county boroughs and towns with a population of over 10,000 was 0·96 per 1000 of the population, in contrast with 0·53 for the whole country and 0·38 for the rural areas.

In regard to the principal epidemic diseases typhus appears to have almost disappeared, only eight cases being notified during the year; on the other hand, there was an increase in enteric, 385 cases being notified, as compared with 304 in the previous year. The increase was almost altogether due to a severe outbreak at Carrick-on-Shannon, causing 80 cases, and due to water-borne infection. There was also an increase in diphtheria, which was nearly counterbalanced by a diminution in scarlatina. Immunisation against diphtheria has been extensively carried out in several counties.

In the year under review five county medical officers of health were appointed, six being already in office. (The number has since been considerably increased.) There has been a slight improvement in the maternal mortality associated with childbirth, the rate per 1000 births being 4·10, whereas the rate for the previous decade was 4·88. There is, however, an appalling mortality under this head in certain rural areas, reaching 7·78 per 1000 in Queen's County and 7·12 per 1000 in County Antrim. The report makes the definite statement that "the delay in appointing county medical officers of health . . . must be regarded as a contributing factor to the excessive mortality associated with childbirth in these counties." The infant death-rate showed a slight increase over the previous year, 70 per 1000 compared with 68, the increase being mainly due to the prevalence of respiratory diseases. The county boroughs still show a very high infant mortality—Limerick 116·7, Waterford 110·3, Dublin 106·2, and Cork 85·2. The mortality among illegitimate children is about five times that among legitimate children.

There was considerable development of medical inspection of school-children during the year, and this branch of preventive medicine has proved popular with the public, and has gained the coöperation of both parents and teachers. It is noted that, generally speaking, school hygiene and sanitation are in a backward condition, especially in rural districts. The atmosphere is often observed by the inspectors to be vitiated, clean sanitary accommodation to be lacking, lighting and heating insufficient, floors and windows dirty, and playgrounds inadequate. Increased use has been made of the School Meals Act. The death-rate from tuberculosis in 1929 was the lowest yet recorded for the country—1·32 per 1000 of the population. It is noted that so rapid

has been the expansion of anti-tuberculosis activity in recent years that the number of patients under treatment under the several public schemes has doubled between 1923 and 1929.

Dealing with the administration of "medical charities," otherwise the dispensary medical service, the report states that in almost all counties graded scales of salaries for the medical officers have been adopted. It also states that use is being made by medical officers of the facilities given them for attending post-graduate courses. The facilities are hardly very attractive at present, as the medical officer going on study-leave has not only to pay all his expenses but also to provide a substitute at his own cost.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

SURPLUS BEDS IN HOSPITALS.

THE former shortage of beds in municipal hospitals in Berlin has now become a surplus, the number of in-patients having greatly decreased. The same position is reported from other cities, notably Dresden and Hanover, where respectively 39 per cent. and 26 per cent. of the available beds are unoccupied. One reason is that the Krankenkassen in order to save expenses are sending fewer patients to hospital than they used to do. Another reason is that the medical men engaged in club practice have less private practice than formerly, and are thus in a position to attend more club patients at home instead of sending them to hospital. Moreover, the fear of losing their employment has led many of the working people to prefer to be attended at home. The municipal authorities of Berlin as long ago as 1930 closed two hospitals which were reopened temporarily during the epidemic of influenza in January, 1931, but were closed again afterwards with two other municipal hospitals containing 2400 beds. In spite of these closures 15 per cent. of the beds in municipal hospitals are still empty, and even those private hospitals in which many wards have been closed for want of means are not full.

A NEW PATHOLOGICAL MUSEUM.

The Pathological Institute of the municipal Friedrichshain Hospital has been reorganised as a pathological museum. This museum was planned many years ago by the late Prof. Virchow. The large quantity of pathological specimens collected since the opening of the big municipal hospital in 1874 has now been systematically rearranged. The sections devoted to specimens of tuberculosis, cancer, syphilis, dysentery, and rickets, and of injuries, especially those caused by the war, are particularly complete; the total number of specimens amounts to 5000. In his opening address Prof. Pick, the director of the museum, pointed out the value of autopsies in confirming diagnosis in medico-legal work, and for insurance statistics as well as in the study of heredity problems.

ACUTE QUININE POISONING.

A patient who had attempted suicide by taking quinine was recently admitted to the Neukölln municipal hospital. Dr. Goldmann states that a man was found unconscious in a street with two bottles labelled sulphate of quinine in his pocket. The stomach having been washed out at a first-aid station, he was conveyed to the hospital in a state of deep coma. The urine contained albumin with casts and red blood-cells. Under camphor and strychnine injections the patient recovered after 24 hours, but was completely blind and nearly deaf. His hearing capacity gradually became normal, but he complained of tinnitus in the ears, of headache, and of palpitation of the heart. Six days after the poisoning his vision began to reappear, but the field of vision was diminished and hemeralopia developed. Four weeks after admission he was discharged from the hospital and attended as an out-patient in the ophthalmological clinic of the university. Two months later his sight was normal, but the field of vision still diminished and the hemeralopia unchanged. Chemical examination proved that he had swallowed 18 g. of quinine sulphate.

STORAGE OF RADIOGRAPHIC FILMS.

New regulations on the storage of radiographic films have been issued by the government. According to those regulations films must not be kept in hospital wards, even in special cabinets. Smoking in rooms where films are preserved is strictly prohibited, and the doors of storing rooms must always be kept closed. No open fires are allowed and a fire extinguisher must be kept in the room. Special regulations apply to film rooms in which more than 150 kg. of films are stored. They must be kept immediately under the roof and the heating, electric installation, and lightning conductors must conform to certain conditions. In rooms containing from 5 to 150 kg. of films the films must be kept in special cabinets and the precautions to be taken against fire and explosion are set out in detail. A collection of films under 5 kg. in weight must be stored at a distance of at least 1 meter from the nearest heating apparatus. The above regulations do not apply to so-called non-inflammable films.

MALNUTRITION OF CHILDREN.

Dr. Heimann has made a report to the Berlin Society for Public Health on an investigation of children recommended for a visit to a municipal health resort. The children came from a district of Berlin inhabited especially by working-class people. Though they had no special disease their weight and their height was far below the normal. Apparently the wages of the parents do not cover the cost of food and housing, and the children of unemployed persons suffer additional privations. Housing conditions proved very unsatisfactory. In 53 cases four persons lived in a single room at once, and in some cases 14 persons in three rooms, so that conditions of gross overcrowding existed. Dr. Heimann found the children's development to be retarded. The number of children sent to holiday resorts has had to be much restricted, and since the maximum stay is six weeks no marked improvement is to be expected.

TREATMENT OF ERYSIPELAS BY IODINE.

Dr. Meyerhof reports on the results obtained in the Hamburg General Hospital by the treatment of erysipelas with tincture of iodine. The whole area of the erysipelas and its surroundings were covered with a thick layer of a 10 per cent. tincture of iodine. The application must be so dense that the skin assumes a chocolate-like colour and must be renewed twice a day until the fever subsides. Among 88 cases treated in this way the fever disappeared after only one or two days in 66 per cent., the average duration of the fever without treatment being six days. Eight cases died from complications.

CORRESPONDENCE

STATISTICAL EXPRESSION OF RESULTS IN MEDICAL RESEARCH: TWO COMMON PITFALLS.

To the Editor of THE LANCET.

SIR,—The statistics required for the convenient recording of results in medical research work are not of a complicated kind, but it not infrequently happens that the interpretation of these statistics is rendered none the easier by an inappropriate method of calculating percentages.

Let us take, as an example from laboratory work, the investigation of the accuracy of a particular test. How often are the results couched in the form, "In so many cases, so many positives were obtained of which so many were incorrect." Or this may be abbreviated into, "So many per cent. of the positives were false positives." If left in that form, what do these results convey? Very little. For if, for example, we are told that "5 per cent. of the positives were incorrect," it subtly suggests a necessary relation between the number of false positives and the total number of all positives. But any relation between them is really no more than an accidental one. The true relation to be expressed is the one between the number of cases giving *false positives*—i.e., cases failing to give correct negatives—and the *total number of cases that should have given negative results*. A reductio ad absurdum will make the matter clear. Suppose in the investigation of a test for syphilis that 100 non-syphilitic cases—and only these cases—were tested, and suppose further that five positive results (therefore *false* positives) were obtained, would we return our results as "100 per cent. of the positives were incorrect"? The absurdity is obvious. What we really should say is "5 per cent. of the non-syphilitic cases were incorrectly returned as positive."

The second source of misunderstanding lies in the difference between statistical material obtained from experimental series and the material likely to occur in actual practice. Again let a hypothetical example illustrate the difficulty.

Two tests for syphilis, Test A and Test B, are under investigation, and the number of correct and incorrect results are expressed as percentages in the manner suggested above. The actual criterion of accuracy, and the means of deciding which cases are syphilitic and which not, need not concern us here; it may be based on clinical material, or the histories of the cases, or the collateral use of other tests as controls. Let us suppose the results worked out as follows:—

Correct results.	Syphilitics.	Non-syphilitics.	Average.
With Test A..	93 per cent. ..	99 per cent. ..	96 per cent.
,, ,, B..	98 ,, ,, ..	98 ,, ,, ..	98 ,, ,,

Let us not run away with the idea that Test A will yield more errors than Test B. For Test A will only yield more errors than Test B *as long as the number of syphilitics and non-syphilitics are equal*. But will they ever be equal in actual practice? Most likely not. And if these tests are investigated for the purpose of applying them as a routine to all such cases as are found in ordinary practice, or in a general hospital, or in a mental hospital (to mention a few possibilities), it is more likely that the material will include, not 50 per cent. of syphilitics, but something like 10 per cent.

On that assumption of 10 per cent. syphilitics, it would mean that in a series of 1000 cases, the errors with Test A would be 7 per cent. of 100, plus 1 per cent. of 900, that is, 16 cases, or 1·6 per cent. Those with Test B would work out at 2 per cent. of 100, plus 2 per cent. of 900, that is, 20 cases, or 2 per cent. This shows that *in actual practice* Test A would yield, not more, but *less* errors than Test B.

All this is elementary enough, and one would hesitate to mention these pitfalls were it not for the hope that such mention might assist towards a greater uniformity in recording results. It may be argued that where detailed figures are given it is an easy matter to work out the required facts for oneself; but in these days of increased and rapid output of research, anyone who has to work through many references in a short while would be considerably assisted were the statistical results invariably given in a form that would express the true state of affairs, instead of one that is not only of little value but which may, to the unwary, prove misleading.

I am, Sir, yours faithfully,

J. ERNEST NICOLE.

Winwick Mental Hospital, Jan. 17th, 1932.

THE CEREBRO-SPINAL FLUID PRESSURE IN CASES OF HEAD INJURY.

To the Editor of THE LANCET.

SIR,—At a discussion at the Royal Society of Medicine on the Diagnosis and Treatment of Head Injuries reported in THE LANCET of Dec. 12th, 1931, it seemed to me that quite an unwarranted degree of importance was attached by most of the speakers to the pressure of the cerebro-spinal fluid. The matter is raised again by Dr. C. M. Hinds-Howell in the paper on Trauma and the Nervous System which appeared in THE LANCET last week.

At the discussion one of the opening speakers said that he decided not to operate on a case in which he suspected intracranial hæmorrhage, because the cerebro-spinal fluid pressure was not markedly raised. As long, however, as there is no interference with the circulation of the cerebro-spinal fluid, mere increase in the volume of the other intracranial contents does not produce any significant rise in the pressure. Thus, though a large hæmatoma may be present the cerebro-spinal fluid pressure may remain within normal limits. Another closely related fact is that *local* cerebral compression (by which hæmorrhage often causes its symptoms) is independent of the general intracranial pressure. The following example from my own experience illustrates this point. In a fatal case a large subdural hæmatoma compressed the underlying cerebral hemisphere, causing gross deformity; yet the general intracranial pressure was only 80 mm. Aq. In a case in which subarachnoid hæmorrhage resulted from a fall and produced a clinical picture of local cerebral compression, the cerebro-spinal fluid pressure was under 180 mm. Aq. In another case of subdural hæmatoma, in which depression of the cerebral hemisphere was seen at operation, the pressure was 150 mm. Aq.

In cases of head injury the pressure is often raised when there is no hæmorrhage and it is apparent from what I have said that it may be within normal limits and even low when hæmorrhage is present. The pressure reading has therefore little diagnostic value in the very cases in which, because of the necessity for operation, help in diagnosis is most required.

Certainly the absence of a rise in pressure has little significance.

In the ordinary cases of head injury (i.e., without hæmorrhage) it is advocated that an increased pressure should be reduced. I doubt whether this is a sound general principle. The cause of the rise of pressure in these cases is not known. As the cerebro-spinal fluid pressure is closely related to the venous pressure, possibly it may be accounted for by venous congestion —with, or without, œdema. If the brain is in a state of venous congestion, with minute hæmorrhages and œdema, a raised cerebro-spinal fluid pressure affords it uniform compression which must tend to minimise the congestion and œdema. On the other hand, since the volume of the intracranial contents is practically fixed, reduction of the amount (and pressure) of the cerebro-spinal fluid must increase the congestion. A rise in pressure is therefore probably a protective influence and it is not surprising that in many cases lowering it produces little good effect. I do not say that it should never be reduced, but each case must be considered individually and reductions should not be applied as a routine measure.

I am, Sir, yours faithfully,

JAMES PURDON MARTIN.

Harley-street, W., Jan. 19th, 1932.

THE TOLL OF THE ROADS.

To the Editor of THE LANCET.

SIR,—Your comments on the dangers of motor traffic in THE LANCET of Jan. 2nd should draw attention to the daily terror in the lives of pedestrians.

In my 1930 annual report as M.O.H. for South West Kent area I wrote as follows :—

"It is a fact that the public health work has been so effective in the reduction of infant and ordinary mortality that the expectation of life in the average individual has been increased by ten years during the last 50 years. There is, however, a very fatal fly in the ointment; during 1930 there were 47 deaths from violence (excluding suicide) in this area, more than in any of the five previous years. Compare this with only one death from diphtheria (none from scarlet fever or typhoid fever) last year, and only 47 from these diseases in the five years. Since 1926 a total of 180 persons have met a violent death, just more than half of the number who died from tuberculosis, 'the captain of the men of death' as John Bunyan described this scourge. It would appear, therefore, that the good results of all the highly organised and expensive schemes of the local authorities are in danger of gradually being wiped out and nullified by the appalling fatalities of our roads. It is high time that the heavy passenger and goods traffic was pushed back to the railways. It is certainly, nowadays, safer for a pedestrian to walk along a railway than a pavement, let alone a road without any footpath, as most are. The railways are safe but the lives of the ratepayers are daily exposed to grave risk on the roads controlled by local authorities, whose duty it is to protect them from 'death from violence' as well as from 'death from infectious disease.' During 1930 in Great Britain 7305 persons were killed and 177,895 injured on the roads. What a justifiable hue and cry there would be if an epidemic of small-pox or typhoid fever broke out, causing this frightful fatality and invalidity."

Dr. Alfred Greenwood, medical officer to Kent County Council, in his 1930 report quotes my above remarks in full and also comments on the problem as follows :—

"A matter of interest in the causes of death may be mentioned—namely, that factor which is so often referred to (possibly crudely, but none the less arrestingly) as 'the toll of the roads.' It is not possible to extract, from the Registrar-General's 'Short List,' those deaths which are actually and definitely attributable to road accidents, in which motor vehicles play so large a part; but it is possible to set forth some figures which should give cause for concern. The attention is arrested by the steady growth of the figures of deaths which are given under the headings 'other deaths from violence' (i.e., excluding cases of suicide). During 1920 in Kent there were 297 deaths from violence, this has yearly gradually increased to 477 in 1930. The same tendency to increase is found in the figures for England and Wales as a whole.

"It is admitted that the figures shown are not solely due to modern traffic conditions—they embrace many other headings of accidental forms of death, such as poisoning, burning, drowning, &c.; but we know that road deaths in a county such as Kent form a large and apparently growing proportion of our deaths from all causes, just as we know that some of the other sub-headings, such as mining, quarrying, and machinery, form in our generally non-industrial county a very small proportion. Kent, with its nearness to the metropolis, its long list of popular and diverse coastal resorts, its no less attractive countryside, and its high reputation for good main roads, offers a great attraction to the pleasure-motorist and every facility for motor transport of goods; and its population seems to pay a fairly heavy price for the privilege. Its 477 deaths from violence represent a total more than twice as high as all the deaths, combined, from those zymotic diseases for which we provide isolation hospitals throughout the county."

What can be done to stop these fatalities?

We doctors are probably the only class who might be justified at emergencies in motoring at an excessive speed, but we would be the first to agree that even "to preserve life" it is unnecessary. Can then the demands of commerce and pleasure (?) justify the modern urge for speed?

The Pedestrians' Association has shown that the roads must be made safer for the people by the provision of safe and satisfactory footpaths, islands, crossings, and other means.

I am, Sir, yours faithfully,

S. NICOL GALBRAITH,
Medical Officer of Health, S.W. Kent Health Area.

Public Health Office, The Castle, Tonbridge, Jan. 11th, 1932.

DIPHTHERIA ANTITOXIN PRESENT IN SCARLET FEVER ANTITOXIN.

To the Editor of THE LANCET.

SIR,—May I ask for the hospitality of your columns to point out an error into which clinicians may be led, unaware that most, if not all, commercial concentrated scarlet fever sera contain a small amount of diphtheria antitoxin? In many batches the amount present is sufficient to cause a Schick-positive subject, who has been attacked by scarlet fever and has received scarlet fever antitoxin, to give for a short period a negative response to the Schick test. This may mislead a clinician who has learnt from long experience that a Schick-negative subject possesses an immunity giving complete protection against a severe attack of diphtheria, and almost complete protection against an attack of any description. Should a "cross infection" of diphtheria occur amongst convalescents from scarlet fever, the medical officer may test all contacts and naturally assume that all who are Schick-negative will continue to be immune. The highest content of diphtheria antitoxin we have found in any concentrated scarlet fever antitoxin would not be sufficient to maintain a Schick-negative condition for long. In a number of hospitals it is now the custom to obtain permission to test, and if necessary, immunise against diphtheria any child admitted, who is suffering from scarlet fever. (The immunisation is, naturally, carried out during convalescence.) In several hospitals in which permission is obtained to immunise most of the children, it has been noticed recently that an unusually high percentage of scarlet fever convalescents are Schick-negative. We were able to explain these unexpected results. The children, owing to the diphtheria antitoxin present in the scarlet fever antitoxin had been wrongly considered as actively, and therefore

permanently, immune; some were but passively, and temporarily, immune.

One could avoid this fallacy by using concentrated scarlet fever antitoxin free of diphtheria antitoxin, but it is extraordinarily difficult in practice to provide a constant supply of such serum. Normal horses purchased for serum institutes may contain a small amount of diphtheria antitoxin in the blood-serum; in some the titre is high. The process which concentrates scarlet fever antitoxin also concentrates any diphtheria antitoxin present.

It is therefore at present impossible to rely on a Schick test done within a few weeks of a previous injection of scarlet fever antitoxin. I am afraid there is no ready or complete solution of the difficulty. The only method the administrator of an isolation hospital can adopt is to carry out as a routine what is now done in the admission room of some hospitals—e.g., Schick-and-Dick-test all patients certified as suffering from scarlet fever. It is true that scarlet fever antitoxin given intravenously immediately afterwards might suppress the response to both tests; if the intravenous injection is given two to four hours later, probably the Schick response will not be inhibited, and a simultaneous intramuscular injection apparently does not suppress a Schick response. I have been unable to trace any large series of recent observations, but Dr. J. S. Anderson, of Leeds, kindly informs me that he has often given therapeutic doses of diphtheria antitoxin intramuscularly within 30 minutes of the injection of Schick toxin and has seen a satisfactory positive response develop.

Dr. J. McGarrity allows me to say that Dr. Claude Ker some years ago read at a meeting, but did not publish, a paper by Ker and McGarrity, recording that into 56 patients suffering from typical diphtheria, Schick toxin was injected intracutaneously at the same time as an intramuscular dose of antitoxin; 48 of the 56 gave satisfactory positive reactions. Dr. McGarrity is of the opinion that therapeutic antitoxin given simultaneously, though it may reduce the response, will in most instances permit a satisfactory Schick reaction to appear. In this hospital recently a girl was given 250 units as a sensitivity test at 5 P.M., at 7 P.M. a Schick test was done, and at 9 P.M. 4000 units were given intramuscularly; a typical Schick-positive reaction developed.

I am, Sir, yours faithfully,

R. A. O'BRIEN.

Wellcome Physiological Research Laboratories, Beckenham, Kent, Jan. 14th, 1932.

TUBAL PREGNANCY.

To the Editor of THE LANCET.

SIR,—With regard to the interesting case of tubal pregnancy reported by Mr. Tanner in your last issue, I would point out that the colouration of the umbilicus is not unknown, as he seems to think, for it has been discussed as a diagnostic sign in the gynæcological literature, from which I am separated at the moment and to which, therefore, I cannot refer beyond saying that to the best of my recollection the first paper on the subject was published in the United States many years ago.

Further, may I ask why the ampullary portion of the tube—presumably containing a tubal mole—was removed? No indication is given either in the text or in the picture of the necessity of so drastic a procedure, especially in a young married woman without children.

I am, Sir, yours faithfully,

Shropshire, Jan. 17th, 1932. W. BLAIR BELL.

LOSS OF MEMORY.

To the Editor of THE LANCET.

SIR,—Dr. Newham in his letter of Jan. 16th refers to the large number of cases of "loss of memory" mentioned in the lay press. I think there is very little doubt that this phrase is, in the vast majority of cases, merely a useful euphemism employed to cover a large variety of syndromes which should perhaps more strictly be described as "mental." But this is unfortunately still a designation which carries with it a stigma, and might even by some be thought libellous.

Such cases as those described in your issue of Jan. 2nd rarely find their way into mental hospitals as certified patients, and in an experience of over ten years I can only recall one such. This was a young hysterical woman with suicidal symptoms who compensated for what I believe to have been a true amnesia for the greater part of her life by a series of phantasies. Unfortunately, every effort to get into touch with anyone who had previously known her proved abortive, as did psychotherapeutic measures. When I last saw her, she was still under certificate and still an "unknown."

During three and a half months as consultant to one of the London mental observation wards I have seen two patients who were brought in by the police suffering from "loss of memory." The first, a married woman from a southern country town, professed to recall nothing of her married life. She knew that she had two children, but was unable to recall their names or to visualise their faces. She knew her name, and by means of papers in her handbag her identity was established. During a fortnight's stay, and with the aid of her relations, her lost memory gradually and almost completely returned. She eventually left in the care of her husband for a convalescence in the country. My personal opinion, based on two short interviews, was that the condition was one of true "hysterical fugue"; it appeared to have been precipitated by apprehension based on the fact that she had carelessly fallen behindhand with some of her weekly bills. It is only fair to add that some others who saw her were of opinion that she was malingering, and feigning illness in order to escape from her husband's just wrath.

The other case—a single man about 30 years old—was interesting. I saw him on Jan. 1st and he could remember absolutely nothing except that he could recall being on a boat, and he thought he had once been in Shanghai. There was found on him a scrap of paper from an envelope with part of a name and address written in his own hand; he could recall neither the place, nor the road, nor the addressee. Apart from his amnesia he appeared quite normal; he was rather depressed, but not more than seemed natural in one who had suddenly lost his identity. I saw him again the week following, when the whole of his memory up to Dec. 24th had suddenly returned. It appears that on that day, whilst riding his motor-bicycle in the Midland town where he was living, he had a trifling accident, knocking down, but not injuring, a pedal cyclist, and sustaining no injury himself. He had but the vaguest recollection of his return to his lodgings that night, and none at all of how or when he got to London, and he did not remember his interview with me the previous week. His memory of Shanghai was correct; he had worked there some years previously. Apart from this gap in his memory he was perfectly clear in his mind, and was allowed to return to his family in the Midlands.

It should, perhaps, be added that neither of these patients was willing to become a voluntary patient in a mental hospital, and that there seemed to be no justification for their compulsory detention.

I am, Sir, yours faithfully,

J. B. STRAFFORD LEWIS.

Banstead Mental Hospital, Sutton, Surrey, Jan. 16th, 1932.

EXTRACT OF SUPRARENAL CORTEX.

To the Editor of THE LANCET.

SIR,—In a paper on three cases of Addison's disease treated with an extract of suprarenal cortex which appeared in THE LANCET of Jan. 16th, Dr. Benham and his colleagues state that the extract of suprarenal cortex used in the treatment contained definitely a small trace of protein amounting to not more than 10 mg. per 100 c.cm.

I would like to point out that the evidence for the presence of even so small a quantity of protein in Eucortone (A. & H.) (which was used in the treatment of the above cases) is very doubtful. In the first place the method of extraction with 80 per cent. alcohol followed by benzene makes it extremely unlikely that protein, even in traces, would be present. Swingle and Pfiffner [1] stated that their extracts gave negative results with the biuret, Hopkins-Cole, Molisch, and Liebermann-Burchard reactions, but positive with the xanthoproteic, Millon's, and alkaline phosphotungstate reactions. The latter are attributed to the presence of phenolic decomposition bodies of adrenalin. Eucortone gives exactly the same results as the above. Moreover, when eucortone is salted out with ammonium sulphate, the small amount of precipitate obtained gives even more indefinite results for the presence of protein. The total nitrogen in eucortone has never exceeded 0·02 per cent., and is usually about 0·01 per cent.

I am, Sir, yours faithfully,

NORMAN EVERS, B.Sc., F.I.C.,
Chief Chemist, Allen and Hanburys, Ltd.

Bethnal Green, London, E., Jan. 19th, 1932.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comdr. J. S. Orwin is placed on the retd. list with rank of Surg. Capt.

The following appointments are notified: Surg.-Comdr. H. F. Briggs to R.A.F. Hospital, Portland; Surg. Lt. F. M. Duthie to *Aphis*.

ROYAL ARMY MEDICAL CORPS.

Capt. G. de N. U. Somers relinquishes his temp. commn.

Capt. T. W. Davidson from the secd. list is restd. to the estabt.

TERRITORIAL ARMY.

Maj. D. H. Coats, R.A.M.C., to be Divl. Adjt., 51st (Highland) Div., vice Maj. W. Campbell, R.A.M.C., vacated.

Capt. J. G. E. Vachell, R.A.M.C., to be Divl. Adjt., 49th (W. Riding) Div., vice Maj. E. J. S. Bonnett, R.A.M.C., vacated.

Lt. C. de W. Kitcat to be Capt.

ROYAL AIR FORCE.

Air Commodore H. V. Wells has been appointed P.M.O., Air Defence of Gt. Britain.

[1] Amer. Jour. Phys., 1931, xcviii. (i), 144.

FOOD EDUCATION SOCIETY.—Dr. Richard Ackerley will lecture on Diet and Personal Hygiene at 29, Gordon-square, W.C.1, at 5 P.M., on Wednesdays, Feb. 10th, 17th, and 24th. Tickets may be had from the Hon. Secretary of the society, at that address.

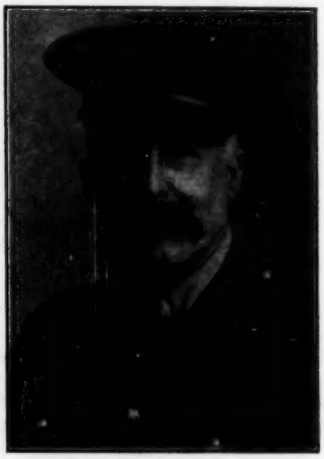
OBITUARY

JAMES CALVERT, M.D., B.Sc., F.R.C.P.,

CONSULTING PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL.

WE recorded last week the death of Dr. James Calvert on Jan. 13th, which occurred unexpectedly at the age of 76, and has left a deep sense of loss on many friends.

James Calvert, the son of the late Edward Calvert of Stonerigg, Cumberland, was educated privately, and proceeded, at a rather later age than is usual with students, to the medical school at St. Bartholomew's Hospital, having graduated as B.A., B.Sc., in the University of London. He was very successful in the school, and obtained first-class honours in the examination for the M.B. Lond. in 1885, and proceeded as early as possible to the M.D. degree. He filled the usual junior appointments at his hospital, and in particular had a long experience as a pathologist and in the post-mortem room. In 1902 he was elected assistant physician and soon afterwards lecturer on materia medica, pharmacology, and therapeutics. He thus established a reputation among students as a practical teacher, while his quiet humorous manner appealed to them. In 1895 he was elected F.R.C.P., and in the following year he became Warden of the residential college at St. Bartholomew's, a position which he filled with great success for a considerable period. In 1913 he became full physician to the hospital and lecturer on medicine in the medical school. He had in the meantime been elected physician to the Royal Chest Hospital in the City-road, an appointment which influenced his practice in a marked manner. He was a thoroughly good clinician, making full use of his accurate knowledge as a morbid anatomist and his special familiarity with diseases of the chest, and both as lecturer and bedside teacher achieved a sound reputation within and without the walls of his own hospital. He was appointed examiner in medicine at different times to the Universities of London and Liverpool, and at the Royal College of Physicians of London, where he held the post of censor.



DR. JAMES CALVERT.

[*Photograph by Elliott & Fry.*

On the outbreak of the war Calvert became senior medical officer and chairman of the medical board at the 1st London General Hospital, at Camberwell, with the rank of Lieut.-Colonel R.A.M.C.(T.). He discharged the duties with marked efficiency, and in this capacity was appointed to conduct an inquiry into a serious outbreak of influenza which occurred at the Crystal Palace at the end of 1918; about 1000 men out of an average number of 5600 stationed at the Palace having sickened with the disease, 117 of

them died from associated pneumonia. At the end of the war, he received the C.B.E. for his services.

Calvert was an infrequent writer, but his contributions to the literature of the two sides of his professional work which personally interested him were of practical value. He wrote the article on Prescribing in Hutchinson's and Collier's Index of Treatment; to the St. Bartholomew's Reports he was an occasional contributor, while clinical reports made by him will be found in the Transactions of the Clinical Society, and of the old Royal Medical and Chirurgical Society. In all the duties which he undertook Calvert was trustworthy, while he discharged them with extreme deliberation, his slow manner and quiet humour being characteristic of him. He was in hospital affairs an admirable colleague.

Dr. Calvert married Therèse, the eldest daughter of the late Mr. John Smithers, and one of his daughters married Sir Eric Stewart Taylor, M.D., the son of the late Sir Frederick Taylor, formerly President of the Royal College of Physicians of London.

HUGH S. DAVIDSON, O.B.E., M.B., F.R.C.S. Edin.

Mr. Hugh Davidson, who died on Jan. 5th after curling at an ice-rink, was one of the most competent and popular members of the medical profession in Edinburgh. He was a good shot and an adept in billiards and tennis, and the physical dexterities that drew him to those games were an asset in his training and practice as a gynæcological surgeon. He graduated as M.B. in 1903 with first-class honours, and became F.R.C.S. Edin. in 1906. He studied for a period at Prague and at Vienna. He had the usual "resident" experiences of a specialist in training, and at the time of his death had become gynæcologist to the Royal Infirmary, physician to the Royal Maternity and Simpson Memorial Hospital, and to the Women's Hospital in Archibald-place. Formerly also he was on the staffs of the Deaconess Hospital and the Chalmers' Hospital. Two years ago he held office as President of the Obstetrical Society. He was recognised as a clever diagnostician, a sound operator, and an excellent teacher.

PUBLIC HEALTH SERVICES

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are 1930 statistics of Kent, Durham, Staffordshire, and Cheshire.

Name of district and estimated (R.-G.) mid-year population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality in childbirth.
Kent (1,176,100)*	15·2	10·9	0·82	1·53	1·1	2·4	45/–	15	3·9
Durham (938,540)†	20·9	11·2	1·06	1·09	1·6	1·4	73/–	33	5·8
Staffordshire (709,380)*	18·6	10·9	0·82	1·28	1·6	1·9	64/–	—	3·4
Cheshire (677,100)*	14·7	11·1	0·65	1·51	1·3	2·3	56/–	27	4·6

* 1930 estimates. † 1929 estimates. Provisional 1931 Census figures: Kent 1,194,115, Durham 924,050, Staffordshire 703,144, Cheshire 675,190.

Registered stillbirths per 100 live births: Kent 3·3, Durham 4·5, Staffordshire 4·4, Cheshire 4·8.

Kent.

Dr. A. Greenwood says 1930 was the first year in which the infant mortality-rate has been lower in the urban than in the rural districts. He is disappointed with the figures for maternal mortality. The puerperal sepsis rate was the highest since 1926, and the rate from other accidents, &c., the highest since 1927. At the V.D. clinics 35 per cent. of the syphilitic and 13 per cent. of the gonorrhœa patients defaulted. There is a tendency to make more use of the public assistance hospitals, and in some areas accommodation has been found for acute cases by the transfer of others to the infirm wards of other institutions. No changes have been made in the out-relief system. A special scheme is in force in Dartford by which the salary formerly paid to the district medical officers is apportioned among eight practitioners in accordance with the work done. The poor-law institutions are all of the mixed type. The Tenterden institution has been appropriated for mental defectives. The work of the county pathological laboratories continues to increase, and the scheme for the treatment of crippled children operates satisfactorily. Mr. A. L. Moreton, F.R.C.S., who was in charge of the 80 beds at the Alexandra Hospital and of four out-clinics shows how the work has developed and increased. He advocates more frequent clinics, so that classes in remedial gymnastics and massage may receive more attention; and says the number of beds at the hospital should be increased. There is usually a waiting-list of some 20 to 40.

There has been a development during the year of antenatal clinics which are mostly staffed by a local practitioner with the assistance of the health visitor and district nurse for the area. These clinics now number 14. In 27 of the 39 sanitary districts which comprise the county council's child welfare scheme, whole-time health visitors act as infant life protection visitors and in the remaining 12 this work is done by district nurses or officers of the public assistance committee taken over from the guardians. About 418 children are being maintained by 284 foster-parents. During the first nine months it was found necessary to remove six children from two foster-parents to places of safety.

Dr. S. N. Galbraith (S.W. Kent United Health Area) says that farms near Maidstone and Tonbridge made increased use of home-pickers of hops and that with cheap bus transport this development may increase. He says there were very few improvements undertaken in the camps and that the week-end visitors remain a great problem. The transmission of infection by hoppers remains a problem. One family of eight, all suffering from small-pox, travelled down last year by ordinary train. The medical care of the hoppers is mostly carried out by voluntary organisations, and a scheme has been devised for linking these organisations in a coördinated plan and for dividing the large hop-picking area into sub-districts. Dr. Greenwood discusses the housing returns from the districts. The closing orders were fewer and the houses demolished more than in the previous year. The shortage of houses is estimated to be considerably greater than in 1929.

A conference of the medical officers of health and sanitary inspectors of the districts was held at Maidstone in March, to discuss the possibility of aiding employment by water-supply schemes, and as a result schemes are proposed in various districts.

Durham.

Dr. C. Franks in his first report says that many of the vital statistics are the most satisfactory on record.

In spite of continued overcrowding and economic distress, the notifications of tuberculosis have shown a continuous diminution since 1928. The deaths caused by motor vehicles (142) were more than those due to coal-mining accidents (103).

In 1918 the county council started a scheme for the provision of midwives in country districts, so as to eliminate the handy-woman. The council guaranteed a salary of £120 to an approved midwife with a bonus of 4*s*. per case up to 150 cases, whether attended as midwife or as a maternity nurse. Each midwife collects her own fees, which are set against the guaranteed income. At the end of 1930 the midwives under this scheme numbered 22 as compared with 19 at the end of 1925, and they attended 1859 cases, 1502 as midwives and 357 as maternity nurses. The total midwives in the county now number 309, only 12 of whom are untrained. They attended 10,930 births and sent for medical aid in 37·8 per cent. of their cases, at a cost to the council of £5472. Dr. Franks discusses the very high percentage of cases for which medical assistance is summoned. The county council does not recover from the patients any of the fees paid to the doctors. No compensation was paid to 85 midwives suspended from practice after being in contact with infectious disease.

The county council took over ten poor-law institutions. The provision of a new central hospital is under consideration. A census of the waiting-lists of county patients for the voluntary hospitals gave the figure 3421, excluding three hospitals, which could not give the information. Plans have been prepared for an institution to accommodate 1000 mental defectives near Darlington. Owing to the restricted institutional accommodation available 1001 mental defectives were supervised at home by health visitors who were all specially trained for the purpose.

Overcrowding is still prevalent in spite of 995 new houses built by local authorities and 881 erected by private enterprise in 1930. A survey is being made of housing conditions in the rural districts with a view to a conference with the various district councils. The epidemic of small-pox has now subsided, the notifications being 34 (with no deaths) as compared with 473 in the previous year.

In 1925 there were 777 registered blind people; in December, 1930, there were 1549, the increase being attributed to more accurate ascertainment. The list includes 12 children under 5 years, three of whom lost their sight from ophthalmia neonatorum. The need for a comprehensive county scheme for the dental treatment of nursing and expectant mothers, and children under 5 years of age, is recognised; nine voluntary dental clinics are in operation.

Staffordshire.

Dr. W. D. Carruthers says that a scheme is under consideration for grouping the 12 transferred mixed institutions; two of them will probably be utilised and extended as general hospitals.

The whole county, except a sparsely populated portion of Leek rural district, is well served by Nursing Associations; 78 are affiliated to the county association and seven are independent and 72 undertake midwifery. The county health visiting area deals with a population of 305,980. Of the 13,243 births 1663 were not attended by midwives, either as midwives or as maternity nurses. The midwives summoned medical aid in 34·6 per cent. of their cases. Dr. Carruthers attributes the increase in this percentage to the better trained type of midwife and to the increased attention paid to antenatal care. Compensation, amounting to £14 5*s*., was paid to various midwives suspended after contact with septic cases, the midwife in each case not being in default. Every practising midwife has the opportunity of attending a refresher course at Tiptree Training Home once in every four years. The fees paid to medical practitioners totalled £2631 2*s*., of which £615 15*s*. 3*d*. was recovered from patients at a cost for collection of £200.

The council have no orthopædic clinics, but pay for cases sent to six clinics established by voluntary bodies.

Milk sampling led to the discovery of 140 tuberculous cows. Of 1540 ordinary milk samples examined, 130, or 8·4 per cent., proved to be tuberculous. One out of 106 samples of Grade A (T.T.) and 18 out of 846 samples of Grade A milk contained tubercle bacilli.

Cheshire.

Dr. Meredith Young says the eight transferred institutions are all of the mixed type and must remain, for the present, under the Public Assistance Committee. Most of the large voluntary hospitals are on the northern border of the county, and the development of a hospital policy will entail much reorganisation which, in his view, could best be achieved by setting up a joint committee, representative of voluntary and rate-supported hospitals. There are ten isolation hospitals serving comparatively small areas. The policy advocated is to reduce the number and to extend selected ones, with interchangeability of staff and patients. Notifications of tuberculosis continue to decrease and the deaths and death-rate in 1930 were the lowest recorded.

Dr. Jean R. Shaw says there are still five midwives who cannot take a temperature, but that they have few cases without a doctor. There are five subsidised midwives, who receive £60 per annum and keep their fees. One receives £80 in a district where most of the cases are attended by a "bona fide" midwife aged over 70.

One application (from the Congleton rural district) for a grant under Section 34 of the 1930 Act towards 75 new houses for the agricultural population was received by the county council and granted in respect of 50 of the houses. A return shows that of the 12 rural districts, one admitted "plenty" of scope for the Housing (Rural Workers) Act, 1926, another "limited scope," whilst three gave a negative and the remainder a blank reply. As the result of complaints from other authorities of tuberculous milk produced in the county, 203 farms were visited and 146 tuberculous cows were discovered and slaughtered. The health committee has decided to appoint a whole-time county veterinary surgeon.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 9TH, 1932.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 68 (last week 54); scarlet fever, 1515; diphtheria, 878; enteric fever, 24; pneumonia, 2525; puerperal fever, 42; puerperal pyrexia, 126; cerebro-spinal fever, 48; acute poliomyelitis, 6; encephalitis lethargica, 13; dysentery, 13; and ophthalmia neonatorum, 94. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Jan. 12th–13th was as follows: Small-pox, 115 under treatment and 2 under observation (last week 82 and 8 respectively); scarlet fever, 1246; diphtheria, 1495; enteric fever, 6; measles, 700; whooping-cough, 408; puerperal fever 18 (plus 12 babies); encephalitis lethargica, 225; poliomyelitis, 2; "other diseases," 283. At St. Margaret's Hospital there were 23 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of 117 great towns, including London, there were no deaths from small-pox, 3 (0) from enteric fever, 35 (11) from measles, 6 (0) from scarlet fever, 36 (2) from whooping-cough, 24 (2) from diphtheria, 40 (6) from diarrhœa and enteritis under two years, and 412 (109) from influenza. The figures in parentheses are those for London itself.

Of the deaths from influenza, 20 were notified from Birmingham, 15 from Croydon, 14 from Manchester, 13 from West Ham, and 12 from Liverpool. Measles caused 5 deaths in Manchester and 4 in Stoke-on-Trent. Six fatal

cases of whooping-cough occurred in Liverpool and 6 in Birmingham.

The number of stillbirths notified during the week was 291 (corresponding to a rate of 40 per 1000 total births), including 50 in London.

MEDICAL NEWS

University of Cambridge.

At recent examinations the following candidates were successful :—

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.

Part I.—Margaret A. Bromhall, J. S. Brown, G. T. Calthrop, E. R. Crisp, Jaganath Das, A. C. Devaraj, Marjorie P. C. Greene, J. P. Grieve, H. J. Ham, M. H. Hellman, C. H. Hilliard, R. F. Innes, J. N. Jacobson, Bhambari Kanhya Lal, J. M. Lees, W. D. C. McCrorie, W. K. Morrison, S. A. Nagga, J. L. Razdan, R. L. Robinson, E. W. H. Shawcross, F. G. Stewart, and E. R. Williams.

University of London.

At recent examinations the following candidates were successful :—

M.D.

Branch I. (*Medicine*).—S. I. Abrahams, Guy's Hosp.; A. L. Banks, Middlesex Hosp.; W. S. Chapman, Univ. Coll. Hosp.; Arnold Clark, St. Bart.'s Hosp.; C. F. Cosin, Guy's Hosp.; S. S. Cruden, St. Bart.'s Hosp.; John Davies and H. A. Dunlop, Westminster Hosp.; M. P. Ellis, Univ. Coll. Hosp.; J. R. Forrest, St. Bart.'s Hosp.; F. A. Gaydon, St. Thomas's Hosp.; F. F. Hellier, Universities of Leeds and Cambridge; D. F. Kanaar, Guy's Hosp.; Simon Kin, King's Coll. Hosp.; L. P. E. Laurent and D. T. R. Morris, Univ. Coll. Hosp.; H. W. A. Post, Guy's Hosp.; Henrietta Procter, Charing Cross Hosp., H. A. H. Selbourne, St. Bart.'s Hosp.; Samuel Shone, Guy's Hosp.; Norah E. Trouton, Roy. Free and St. Mary's Hosps.

Branch III. (*Psychological Medicine*).—E. Mildred Creak and Mary C. Luff, Univ. Coll. Hosp.

Branch IV. (*Midwifery and Diseases of Women*).—Olive K. Burnett, Evangeline A. Clark, Gladys Kay, and Emma J. King, Roy. Free Hosp.; Gladys E. McCabe, Roy. Free and St. Mary's Hosps.; Eva J. Newton and Thelma Shepherd, Roy. Free Hosp.

Branch V. (*State Medicine*).—†G. R. Marcano, St. Thomas's Hosp.; H. L. Oldershaw, St. Bart.'s Hosp.

Branch VI. (*Tropical Medicine*).—†A. G. Harsant, London Hosp.

† Awarded a Mark of Distinction.

Royal College of Surgeons of England.

At a quarterly meeting of the Council held on Jan. 14th, with Lord Moynihan, the President, in the chair, a diploma of Fellowship was granted to Ralph Owen Lee (Camb. and St. Thomas's), and diplomas of Membership to Henry Fauconberge Bateman (Camb. and Bart.'s) and Gerald Ashton (Oxford and Univ. Coll.). Diplomas in psychological medicine were granted jointly with the Royal College of Physicians to the following candidates :—

C. E. Allen, J. C. Batt, F. H. Beare, H. C. Beccle, C. L. C. Burns, E. N. Butler, Irene Dixon, W. J. McCulley, F. L. McLaughlin, J. H. Mulvany, E. U. H. Pentreath, Irene Yates, and G. C. Young.

Diplomas in laryngology were granted jointly with the Royal College of Physicians to the following candidates :—

V. Y. Apte, Muhammad Basheer, V. U. Chitale, N. M. Cuthbert, H. J. Eizenberg, E. W. Ingle, H. Y. Khwaja, D. A. P. Macalister, N. D. Matson, C. K. C. Misra, B. F. Niblock, E. R. G. Passe, and M. A. H. Siddiqi.

Mr. E. Rock Carling, Mr. A. E. Webb-Johnson, and Mr. Claude Frankau were readmitted members of the court of examiners. Miss M. L. Tildesley was appointed curator of the department of human osteology in the Museum. Mr. H. Jackson Burrows was appointed honorary director of the cytological laboratory. Mr. FitzRoy Sapte was appointed solicitor to the College in place of the late Mr. E. Hugh N. Wilde.

The Hallett Prize for anatomy and physiology was awarded to Mr. D. M. Stern, M.B., of London Hospital and University College, London. Sir Buckston Browne was congratulated on having received the honour of knighthood. The secretary reported that John Hunter's walking stick had been presented to the College by the family of the late Mr. Morrant Baker. Plans were approved, and an estimate accepted, for the erection of laboratories and farm buildings for the Buckston Browne Surgical Research Farm at Downe.

Harveian Society of London.

The following have been elected officers of the Harveian Society for the coming year :—President : Mr. C. P. G. Wakeley ; Vice-President : Dr. G. E. Oates, Mr. D. C. L. Fitzwilliams, Dr. E. L. Gowlland, and Dr. A. H. Douthwaite ; Treasurer : Dr. G. de Bec Turtle ; Hon. Secretaries : Dr. R. Cove-Smith, and Prof. Tom Hare ; Council : Dr. J. Bamforth, Dr. Macdonald Critchley, Mr. E. A. Crook, Mr. H. C. Edwards, Dr. C. Nixon Groves, Dr. V. S. Hodson, Dr. T. C. Hunt, Dr. A. D. Morris, Mr. L. E. C. Norbury, Dr. G. E. Orme, Dr. H. Rivers Pollock, and Dr. H. L. Wood.

Hunterian Society.

A banquet to commemorate the 204th anniversary of the birth of John Hunter will be held at the May Fair Hotel, Berkeley-street, W. 1, on Thursday, Feb. 11th.

International Society of Surgery.

The ninth triennial meeting of this society will be held at Madrid from March 15th to 18th, under the presidency of Prof. F. de Quervain of Berne. The four main subjects of discussion are : Non-tuberculous Pulmonary Suppuration ; the Diagnosis and Treatment of Intraspinal Tumours ; the Surgery of the Œsophagus ; and Recent Progress in Surgical Anæsthesia. Visits will be paid to Seville, Cordoba, Granada, Valencia, and Barcelona. Particulars may be had from the secretary-general of the Society, Dr. L. Mayer, 72 rue de la Loi, Brussels.

Donations and Bequests.

The late Mr. Bilton Pollard, Emeritus Professor of Clinical Surgery in University College, London, left estate in his own disposition of the gross value of £60,015, with net personalty £56,702. Among other bequests and subject to a life interest he left £10,000 to University College Hospital, London, upon trust for investment and to apply the income for Fellowships for men students of that hospital who have already served as house physicians or house surgeons there ; £5000 to Epsom College, upon trust for investment and to apply the income for the benefit of students intending to adopt a professional career. The ultimate residue of his property he left as to two-thirds to University College Hospital, upon similar trusts as defined for the £10,000 bequest ; and one-third to Epsom College, upon similar trusts as defined for the bequest of £5000.—The late Miss Mary Eliza Thomas, of Blackpill, near Swansea, left £1000 to the Mission to Lepers ; £500 to the Hospital and Home for Incurables, Putney ; and £500 to the British Empire Cancer Campaign.

Medical Society of Individual Psychology.

The annual dinner of this society was held at the Florence Restaurant on Jan. 14th. Dr. Langdon Brown, the President, said that, unlike a speaker at a certain Rotary Club lunch, he would not claim that they were dining for the good of humanity, but he hoped their purpose might have some effect in that direction. For anything which promoted the interests of individual psychology would afford real help to sufferers, since probably more people are ill because they are unhappy than unhappy because they are ill. Einstein had described Adler as the Sancho Panza to Freud's Don Quixote. The society would not object to that description ; although Don Quixote was the more romantic figure of the two, Sancho Panza, with his humour and sturdy common sense, stood for more real achievement. To adapt a famous parable : the priest was unable to help a man wounded by the slings and arrows of outrageous fortune who had never heard of Hegel and knew nothing of Kant's categorical imperative. The Levite said he was afraid it would be necessary for him to come to him for an hour every day for about two years before he could promise much help ; thus it was left for the good Samaritan to apply a simpler and more direct method of putting the sufferer on his feet again. Dr. F. G. Crookshank, proposing the health of the guests, said he felt it was more profitable to speak about the society. Its object was not only to discuss Adler's teaching, but also to make his works known to medical practitioners. Of these, there were three classes. Firstly, those who practised the methods of individual psychology without knowing that they were doing so. Secondly, the "anti-Adlerians"—he had found that these people had never read anything of Adler's. Thirdly and lastly, there were those who had read Adler's works—these were already Adlerians. Individual psychology was of all the schools of psychology the most applicable to general medicine. Lister had revolutionised surgery by the introduction of antisepsis. The cumbersome methods of antisepsis had been quietly displaced by the simplistic methods of asepsis. A parallel might well be drawn here between the methods of antisepsis and Freud's teaching on the one hand, with the comparatively simple methods of asepsis and individual psychology on the other. Dr. Bernard Hart, replying for the guests, said that from the pragmatical point of view Adler's method was one of the most fertile that has yet been devised. Dr. Harry Campbell said he thought it likely that Freud and Jung would have derived benefit had they studied the works of Locke and John Stuart Mill. Their language would probably have been less obscure. Adler's teaching appealed to him chiefly as being "common sense." Dr. Cuthbert Dukes said it was interesting that both Lister and Freud were combative, whereas the method of asepsis and individual psychology had made their way quietly, unostentatiously, and without opposition. Dr. M. B. Ray told some excellent stories, and the evening ended with mutual expressions of esteem.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, Jan. 25th.—8 P.M., ODONTOLOGY. Casual communication: Mr. J. Edgley Curnock: Osteomyelitis of Jaw—Spontaneous Fracture. Paper: Mr. E. C. Sprawson: Preliminary Investigation of the Influence of Raw Milk on Teeth and Lymphoid Tissue.

WEDNESDAY.—5 P.M., COMPARATIVE MEDICINE. Discussion: *B. welchii* Infections in Animals and Man. Opener: Major T. Dalling, followed by Mr. A. D. McEwan, Dr. Muriel Robertson, Mr. B. W. Williams, Prof. C. C. Okell, and others.

THURSDAY.—8.30 P.M., UROLOGY. Mr. Ralph Thompson: The Treatment of Urinary Calculus. (Presidential address.)

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, Jan. 25th.—8.30 P.M., Discussion on the Causation and Treatment of Essential Hypertension, to be introduced by Dr. Geoffrey Evans and Dr. G. Arbour Stephens.

MEDICO-LEGAL SOCIETY.

THURSDAY, Jan. 28th.—8.30 P.M. (11, Chandos-street, Cavendish-square, W.), Dr. L. A. Weatherly: The Liberty of the Subject from the Medico-legal Aspect. To be followed by a discussion.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.

FRIDAY, Jan. 29th.—8.30 P.M., Mr. David Lees: Paper on Observations on Syphilis of the Nervous System and its Treatment. A discussion will follow.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

MONDAY, Jan. 25th, and following WEDNESDAY and FRIDAY.—5 P.M., Sir Arthur Keith: Malformations of the Human Body from a New Point of View.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Jan. 25th, to SATURDAY, Jan. 30th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square. Lectures on Endocrinology by Dr. W. Langdon Brown, at 8.30 P.M. Mon., The Parathyroids and Calcium Metabolism. Fri., The Adrenals and the Gonads. Lectures on Treatment, Wed., at 4 P.M., by Dr. B. T. Parsons-Smith on Heart Disease.—METROPOLITAN HOSPITAL, Kingsland-road. Mon., Post-graduate demonstration of Ward Cases by Dr. P. Hamill at 2 P.M.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. Post-graduate demonstration by Mr. Lyle Cameron on Tues., at 2.30 P.M.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Post-graduate course in Dermatology. Clinics at 2 and 6 P.M. Lectures on Tues. and Thurs. at 5 P.M.—Further particulars from the Fellowship of Medicine.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.6.

MONDAY, Jan. 25th.—10 A.M., Genito-Urinary Operations, Gynæcological Wards. Skin Department. 11 A.M. Surgical Wards. 2 P.M., Surgical Wards, Medical, Surgical, Eye, and Gynæcological Out-patients.

TUESDAY.—10 A.M., Medical Ward Demonstration. Operations. Dental Department. 11 A.M., Throat Operations; Surgical Ward Demonstration. 2 P.M., Operations, Medical, Surgical, Throat Out-patients.

WEDNESDAY.—10 A.M., Children's Medical Out-patients. Medical Wards. 2 P.M., Gynæcological Operations. Medical, Surgical, and Eye Out-patients. 4.45 P.M., Venereal Diseases Demonstration.

THURSDAY.—10 A.M., Neurological Department. 11.30 A.M., Fracture Demonstration. 2 P.M., Operations, Medical, Surgical, Eye, and Genito-Urinary Out-patients.

FRIDAY.—10 A.M., Medical Wards, Skin Department, Dental Department. 12 noon, Medical Lecture. 2 P.M., Operations, Medical, Surgical, and Throat Out-patients.

SATURDAY.—9 A.M., Throat Operations. 10 A.M., Medical Wards, Children's Medical Out-patients. Surgical Out-patients.

NATIONAL HOSPITAL, Queen-square, W.C.

MONDAY, Jan. 25th.—2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Mr. Williamson Noble: Papilloedema.

TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Mr. Armour: Chordotomy.

WEDNESDAY.—2 P.M., Dr. Purdon Martin: Out-patient Clinic.

THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Riddoch: Pathogenesis and Treatment of Headaches.

FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Mr. Elmquist: Demonstration of Re-educative Exercises.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, University-street, W.C.

TUESDAY, Jan. 26th.—5.15 P.M., Dr. R. A. O'Brien: Preparation Testing and Use of Antitoxin.

CHARING CROSS HOSPITAL MEDICAL SCHOOL.

SUNDAY, Jan. 24th.—10.45 A.M., Mr. E. D. Davis: Diseases of the Ear. 11.45 A.M., Mr. A. O. Gray: Causes and Treatment of Sterility.

GUY'S HOSPITAL, London Bridge, S.E.

MONDAY, Jan. 25th.—5 P.M., Prof. J. M. W. Morison: The Use of X Rays in Physiological Investigations.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.

THURSDAY, Jan. 28th.—9 P.M., Dr. G. F. Still: Epilepsy in Children.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

TUESDAY, Jan. 26th.—3.15 P.M., Mr. N. A. Jory: Earache.

ST. MARK'S HOSPITAL, City-road, E.C.

THURSDAY, Jan. 28th.—4.30 P.M., Dr. Cuthbert Dukes: Pathology of Fistula and Fissure.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.

WEDNESDAY, Jan. 27th.—4 P.M., Dr. J. Alison Glover: Tonsillitis.

CITY OF LONDON MATERNITY HOSPITAL, City-road, E.C.

THURSDAY, Jan. 28th.—5.30 P.M., Mr. A. L. Walker: Treatment of Contracted Pelvis.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, Jan. 26th.—5 P.M., Dr. A. M. H. Gray: The Sarcoids.

THURSDAY.—5 P.M., Dr. M. Sydney Thomson: Lichen Planus.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.

THURSDAY, Jan. 28th.—3 P.M., Dr. E. Blake Pritchard: Clinical Varieties of Muscular Weakness. (Clinical meeting for Medical Practitioners.)

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY, Jan. 29th.—4 P.M., Mr. F. W. Watkyn-Thomas: Fractures of the Skull and Otology.

ST. PETER'S HOSPITAL, Henrietta-street, W.C.

WEDNESDAY, Jan. 27th.—3 P.M., Dr. J. Roth: Modern Uro-radiological Investigation.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.

WEDNESDAY, Jan. 27th.—4 P.M., Dr. R. Fortescue Fox: The Rise of the Conception of Rheumatism as a Social Problem.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.

WEDNESDAY, Jan. 27th.—4 P.M., Dr. C. E. Lakin: Demonstration of Medical Cases.

ST. MARY'S HOSPITALS, Manchester.

FRIDAY, Jan. 29th.—4.15 P.M. (at the Whitworth-street West Hospital), Dr. Fletcher Shaw and Dr. J. W. Bride: Antenatal Demonstrations.

EYE INFIRMARY, Glasgow.

WEDNESDAY, Jan. 27th.—4.15 P.M., Mr. A. B. J. Pollock and Dr. H. S. Martyn: Eye Cases.

FACULTY HALL, St. Vincent-street, Glasgow.

TUESDAY, Jan. 26th.—4 P.M., Dr. D. K. Henderson: Modern Trends in Psychiatric Practice.

Births, Marriages, and Deaths

BIRTHS.

CHARTERS.—On Dec. 16th, at Tunbridge Wells, the wife of A. D. Charters, M.B. Camb., D.T.M. & H. Eng., of a son.

GOOD.—On Jan. 13th, at a nursing home, Horsforth, the wife of Dr. John Good, Stonegate-avenue, Meanwood, Leeds, of a son.

MARSH.—On Jan. 5th, at Devonshire-street, W., the wife of L. Russell Marsh, L.D.S. Eng., of a son.

WEINER.—On Jan. 16th, at "Maefil," Clapgate-lane, Ipswich, the wife of Philip Weiner, M.R.C.S., L.R.C.P., of a son.

MARRIAGES.

KING—O'LEARY.—On Jan. 14th, at St. James's Church, Spanish-place, W.1, Reginald Alfred King, M.B., B.S. Lond., F.R.C.S. Eng., to Mary O'Leary, M.R.C.S., L.R.C.P., D.P.H., daughter of Mrs. J. O'Leary and the late Mr. J. O'Leary, of Mologhroe, Co. Cork.

DEATHS.

CALVERT.—On Jan. 13th, suddenly, James Calvert, C.B.E., M.D., F.R.C.P., Consulting Physician to St. Bartholomew's Hospital, of Harley-street, and Portman-mansions, W., aged 76.

COLEMAN.—On Jan. 13th, at Corners, Littleover Hill, Derby, James George Blyth Coleman, M.D., in his 62nd year.

GREENWOOD.—On Jan. 13th, at his residence, Thurlow Park-road, Dulwich, from heart failure, Percy Greenwood, L.D.S. R.C.S. Eng.

MAGORIS.—On Jan. 14th, at Great Shelford, William Owen Magoris, M.R.C.S., L.R.C.P., aged 71.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

POST-VACCINAL ENCEPHALITIS:

ITS ASSOCIATION WITH VACCINATION AND WITH POST-INFECTIOUS AND ACUTE DISSEMINATED ENCEPHALITIS.*

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Principal Characteristics.

Post-vaccinal encephalitis appears to be an infection of recent date. Its beginning, or rather our knowledge of it, dates from the year 1922. The earliest cases were discovered in England then, and independently in Holland in 1924. Other and older cases were forthwith recalled as, on a retrospective diagnosis, having been certain or at least probable examples of the same condition—for example, that of Turnbull, going back to 1912, while others still earlier were recollected by doctors in Switzerland, Germany, and elsewhere. These "retrospective" cases do not, however, go further back than the closing years of the past century.

It has not been possible to find any clear indications of complications of an encephalopathic nature following vaccination during the long series of years which succeeded Jenner's discovery. Gins (personal communication) has come across a vague mention of nervous complications in the works of an early vaccinator, Sacco. Kaiser has recently cited an official report in Bohemia in 1801, which alludes to nervous reactions following Jennerian vaccination.[1] In past times certain special commissions for the study of the dangers of vaccination were in session in England for considerable periods; and a most persevering and minute inquiry of this kind was made on complications observed after vaccination without the discovery of cerebral involvement (Royal Commission on Vaccination 1889–1896). A similar inquiry in Holland in 1902, to which 90 per cent. of the doctors in the country contributed, reported as nervous complications following vaccination only two cases which were tuberculous meningitis (Jitta).[2] It is, of course, quite possible that one or two isolated cases may have escaped detection, but it seems unlikely that epidemic waves, such as those which have occurred in England and Holland, could have passed unrecognised.

Until wider information is at our disposal we must conclude that encephalitis as seen at the present day has not been contemporaneous with the practice of vaccination, which has been world-wide for nearly 100 years without revealing attacks on the nervous centres of those vaccinated. Hence, both on presumption and in practice, here is a new disease and one of recent date.

DISTRIBUTION.

Post-vaccinal encephalitis has a very irregular geographical distribution (vide previous report of 1930).[3] Many countries have not been affected; in them, in spite of careful inquiry, not a single case has been observed. The countries which have suffered the most, but now to much less extent than in previous years, are England and Holland, while Austria, Germany, Norway, Sweden, and the United States have supplied an appreciable number of cases. Then follow countries with rare sporadic cases, and, finally others, where all that can be said is that the statistics of the malady are merely represented by a zero.

How are these topographical differences to be explained—maximum incidences in one place and no incidence in another? The difference in the age selected for vaccination helps to explain the inequality of distribution; encephalitis will be found where the primary vaccinations are, as a rule, performed at school age—the period which is most susceptible as regards encephalitic invasion.[3]

Even in England and Holland, however, the chorographic distribution of cases is most irregular, and one can only surmise from this that here is one more example of what is usual for other epidemic infections. Even in countries which have suffered most from it, the disease is rare and the attack rate forms an infinitely small percentage, whether in relation to the general population or to the number of persons vaccinated.

NEUROLOGICAL MANIFESTATIONS.

Post-vaccinal encephalitis has its own neurological characteristics but at times assumes polymorphous forms. These morbid characteristics continue to be manifest and, especially in the English series, the majority of cases diagnosed as post-vaccinal encephalitis are still in their clinical aspect identical with the cases originally described. The condition is fundamentally monotypical, repeating itself in case after case. Its evolution is that of an acute disease which, in cases of recovery, is quickly over without leaving any complication. Sequelæ are relatively rare by contrast with encephalitis lethargica and with other varieties of meningitis and encephalitis.

When one looks at these happenings as a whole, it appears that there have been more exceptions to this general homogenicity of symptoms recently; in other words, that the clinical manifestations and the nature of the syndrome have become more variable. If post-vaccinal encephalitis was originally monotypical it has escaped from its exact boundaries and is showing definite tendencies to variation. One may, therefore, have to add to the original picture localised paralyses, hemiplegias, convulsions, polyneuritis, &c., and these complications at times introduce serious difficulties in the diagnosis and the clinical typing of the disease. However this may be, it is not enough merely to attach this label whenever nervous complications appear in a vaccinated case. The data obtained should undergo careful sorting with a view to eliminating infections which are associated with a known or likely cause, such as syphilis, cerebro-spinal meningitis, tuberculous meningitis, purulent meningitis, encephalitis lethargica, poliomyelitis, &c. Grey and Whittaker [4] have reported two cases of staphylococcal septicæmia in which post-vaccinal encephalitis had been diagnosed from which, following the Rolleston Commission, they concluded that the bacteriological investigations necessary to exclude septicæmia are never to be forgotten in the examination of these cases. Priest [5] reports a similar case which one would have looked upon as post-vaccinal encephalitis if a blood culture had not revealed the presence of *Staphylococcus albus*. Certain cases occurring in Holland thought to be post-vaccinal encephalitis have been found on autopsy to be due to some entirely different condition (communication from Mr. Jitta). And even when all these exclusions have been made there still remain some cases which are indefinite or doubtful owing to the absence of sufficient signs or other reasons.

Gins [6] would like to see a most rigorous distinction established—the diagnosis of encephalitis to be reserved for cases in which cerebral inflammation has been established histologically, or for those which are followed by sequelæ indicative of encephalitis. All other conditions should be called *nervous complications*. Since autopsies are rare and sequelæ infrequent, the resulting total of proved cases of encephalitis would, on this basis, be decidedly meagre. In our

* Translation of the substance of a report to the Commission on Small-pox and Vaccination of the Office International d'Hygiène publique by Prof. Ricardo Jorge (Delegate for Portugal), President of the Committee. This report, which was prepared in consultation with the rapporteur on the subject (Sir George Buchanan, Delegate for Great Britain), was submitted to the Permanent Committee of the Office International d'Hygiène publique at its session of October, 1931, and appears in the Bulletin mensuel de l'Office International, December, 1931.

working terminology, which requires a convenient and short term, the post-vaccinal nervous affections which do not fit exactly to type habitually receive the encephalitis label. Moreover, it has been established by many observers that there are cases terminating by recovery the characteristics of which have been identical with those of fatal cases; there is here no valid reason to make any separation.

HISTOLOGICAL TYPES.

The lesions met with in post-vaccinal encephalitis repeat a histological type which is uniform and characteristic. While the disease may be polytypical in its clinical features, it is monotypical in its pathological anatomy. Its histological protocol was fixed (1928) in England by Perdrau, and in Holland by Bouman—*cellular perivascular infiltration* and zonal disappearance of the myelin sheath (*demyelinisation*).

RELATION TO POLIOMYELITIS AND ENCEPHALITIS LETHARGICA.

Can post-vaccinal encephalitis be linked with encephalitis lethargica or with poliomyelitis? It was encephalitis lethargica which in the first instance was thought to carry responsibility for these nervous sequelæ of vaccination. The concurrence of epidemic curves in the two forms of encephalitis in Holland seemed at first to support this inference. But it had soon to be set aside in face of the discord between the two tracings which was established in England. At one time one thought also of Heine-Medin's disease, but set this also aside on account of epidemiological and other differences. Nevertheless these theses have not been entirely abandoned, since some are still disposed to accept them; for example, Ustvedt,[7] of Oslo, while leaving a place for vaccination in its ætiology, attributes post-vaccinal encephalitis to the virus of poliomyelitis and then recommends the suspension of vaccination in areas invaded by poliomyelitis. Both epidemiology and pathological anatomy are opposed to this identification. In Sweden, post-vaccinal encephalitis has been distinguished from poliomyelitis without difficulty [8] and the same applies to encephalitis lethargica. Van Rijssel,[9] however, observes that in the course of the last two years the aspects of the two types of encephalitis are becoming more and more alike; it is only the anatomical localisation of the microscopic lesions which establishes the difference between them. This clinical assimilation seems over-emphasised; both in England and in Holland the two kinds of encephalitis have been separated with little difficulty.

Moreover, if one or the other of these viruses were involved in the production of post-vaccinal encephalitis, it should be possible in the course of several epidemics to detect the appearance or the recrudescence of post-vaccinal encephalitis cases.

In this connexion mention should be made of an epidemic of encephalitis lethargica of Sicard's myoclonic type, which in 1929 invaded a district in the Tyrol near Innsbruck (Keisch).[10] Myoclonus attacked vaccinated and non-vaccinated infants in equal proportion. The only difference was that the general condition was more satisfactory in the non-vaccinated, a point worth noting.

AGE INCIDENCE.

The incidence of encephalitis is particularly selective among those primarily vaccinated between the ages of 3 and 13, and its onset is on an average from the tenth to thirteenth day after the inoculation. The statistical evidence of this selectiveness has served to confirm the well-established precept of vaccinating in infancy; by doing this one limits the risk of contracting encephalitis. The risks are much less for revaccinated persons than for those vaccinated for the first time.

Encephalitis occurs at a variable period after vaccination. The statistics agree in showing that more than 80 per cent. of the cases appear in a most regular manner after a lapse of from 10 to 13 days following cow-pox inoculation.

MORBIDITY AND MORTALITY.

The morbidity is very low and the mortality is very high. The percentage of cases, even in places where the complication most frequently occurs, is almost infinitely little in comparison either with the total of vaccinations or with the population. The incidence is not even proportional to the intensity of a vaccination campaign, although two years ago, during an epidemic of variola minor in Holland, the greater activity in vaccinations provoked a recrudescence of cases. On the other hand, the fatality is high, exceeding that of other types of encephalitis. The percentage in England has reached 58; in America 43, Germany 34, Holland 34, although in Vienna and in Lower Austria during the winter of 1929 the percentage figure was 17·8 and in Sweden was as low as 14 (communication from Kling). It must be noted, however, that a progressive diminution in mortality in Holland has been observed, so that in 1928–29 the rate did not exceed 25 per cent. (communication from Dr. Jitta).

Is Cow-pox the Direct Cause of Encephalitis?

This was the question which at once arose on the discovery of the early epidemic cases. Is it the vaccine itself which reaches the brain and by its own toxi-infective action starts the morbid process?

Thoughts were first directed to some accidental change in the vaccine lymph, something superimposed and capable of causing accidents never before manifested. Research carried out in England and particularly in Holland has, however, abundantly proved that the production of encephalitis is in no way attributable to faulty preparation or to any specific property of the particular lymph employed. Samples of cow-pox of different origins have been tried and lymphs of all possible strains have been chosen, but the accidents in question have still occurred. Hence one definite conclusion, adopted by the conferences of Berlin and Geneva: post-vaccinal encephalitis cannot be attributed to any defect in, or to any special property of the vaccine employed.

The methods of preparation of lymph used in vaccine institutes, varied though they are, the choice of the strain, and the technique of the vaccination are not therefore to be incriminated. Endeavours have, however, been made to relate the phenomenon to the super-activation of cow-pox and to the processes adopted either to augment virulence or to obtain the maximum success in the performance of vaccination. The idea of this relation, though it may not be so bluntly expressed, has all the same formed the the basis, wholly or partly, of prescriptions which have been formulated and accepted with the object of reducing the hyper-virulence of lymphs as now measured and standardised, and at the same time of diminishing the cutaneous area of the inoculation, reducing it to a single linear or punctiform insertion; too much virulence and too much virus may be harmful.

Though the matter may be looked at in this way, it is, however, the case that post-vaccinal encephalitis is not dependent on the intensity of the vaccinal reaction, either general or local. There are epidemic series in the course of which one sees that vaccinated persons have shown vigorous reactions but without any accident to the nervous system, while others, in whom the effect of the operation was barely appreciable, did not escape attack. Moreover, the use of low-virulence vaccines has still been accompanied by encephalitis; in Holland strains were employed which had previously been rejected on account of their low virulence, but encephalitis continued to occur.[11]

One process of super-activation has been specially suspected—namely, the passage of lymph through the rabbit, a process to which vaccine institutes have recourse when the virulence of their lymph is found to be falling. Netter (1929)[12] has condemned this method of reinforcement of cow-pox by rabbit

inoculation. But there are several replies to this. The practice of rabbit transfer is relatively ancient, and was adopted long before the appearance of encephalitis. The use of vaccines which are innocent of passage through any animal other than the calf has also been followed by accidents—e.g., the case of the Japanese strains which were employed in Holland and which had never been passed through the rabbit (Jitta). Finally, the product called neurovaccine, by Levaditi, or neurolapine, grown and recovered from the brain of rabbits, has been used in Spain to vaccinate thousands of cases without the least nervous complication having been observed, although the same strain when taken to Holland was connected with the appearance of cases just as had happened with the other strains used in that country. The Geneva conference considered the process of rabbit passage to be unobjectionable and gave it express approval.

Given then that all lymphs are alike for the present ætiological purpose, the next question is whether we have to do with some property inherent in vaccine virus itself but only disclosed by the intervention of one or more second causes the nature of which so far are unknown.

The following are arguments which can be put forward in favour of such hypothesis, which is one which would imply that vaccine lymph can possess an encephalitogenetic property.

CONSTANCY OF INCUBATION PERIOD.

The comparative constancy of incubation—that is, of the period which elapses between inoculation and the occurrence of the complication—comes out wherever the statistics are obtained. It was pointed out for the Dutch series, along with the inferences which could be deduced from it, in the notes presented to the Permanent Committee of the Office International in October, 1925, and in January, 1926 (Jorge). The Andrewes Commission had also noted it in the English series presented in their report of 1926. One could regard encephalitis as a breaking out of a morbid process dependent on the vaccine inoculation itself after a regular interval of time. The argument is an indirect one but nevertheless bears weight, and whatever theory of the pathogenesis of encephalitis is recognised as valid, it must take account of this basic fact.

Even more striking is the fact that this period is the same as that which takes place before the appearance of the vaccinal rash in *generalised vaccinia*. The most striking effect occurs in the case where the two phenomena appear simultaneously—encephalitis and the secondary vaccinal eruption. The coincidence was observed for the first time in a Portuguese case,[13] in which meningo-encephalitis appeared on the tenth day accompanied by a vaccinal eruption on the arms and upper part of the trunk. To this, then the only known case, was added an identical one[14]—that of an infant who on the nineteenth day after vaccination presented concurrently severe cerebral symptoms (convulsions, hemiplegia), and the eruption of cowpox (face, neck, chest, back, and the upper part of the arms).

CURATIVE ACTION OF SERA.

Considerable interest has been aroused by the initiative taken by Hekman, of Rotterdam,[15] in submitting encephalitic children to a systematic course of intravenous injections of immune serum obtained from the blood of parents who had been recently vaccinated (1929–1930), and the results thus obtained. In a series of ten cases, the injection of the antivaccinal serum was immediately followed by a fall in temperature and an amelioration of the general symptoms. Eight cases recovered; only two were fatal, one of which was in extremis. While there may be some doubt as to the diagnosis or the gravity of some of the cases in the series, one must nevertheless give due appreciation to the results of a therapy which provides the hitherto helpless physician with a weapon of attack.

Hekman limited himself at first to the serum of parents vaccinated at the same time as the patient—an homologous serum. In default of this he also employed, and with some success, the serum of a parent vaccinated four years previously. Thomas Horder had previously employed the same method in England, on Gordon's advice, injecting the serum of the mother, who had been vaccinated in infancy, with satisfactory result. Grüneberg[16] has added two cases, also of recovery, to this series. Thus an anti-encephalitis therapy has made its appearance. It has been officially recommended in Germany, and Paschen, of Hamburg, has collected a reserve of serum from nurses recently vaccinated. In the absence of human serum, recourse may be had to that of immunised horses, with which Bouman obtained cures in two cases. In England, Ledingham and Petrie have prepared for the same purpose an anti-vaccinal horse serum. A recent circular of the Ministry of Health places this Lister Institute serum at the disposal of medical practitioners, basing its action on "the success which has been obtained in certain cases on the Continent by the treatment of this condition by intravenous injection of serum derived from persons who have been recently vaccinated."[17]

"Naturam morborum curationes ostendunt" is an aphorism of Hippocrates. Hekman and Netter,[18] as well as others who have applied the method, see in the curative action of this serotherapy the proof of the vaccinal nature of encephalitis—the antibodies neutralising the antigen. But here again the objection is made that one must not conclude from the clinical conclusions of a serotherapy that a specific action is necessarily involved; for some heterologous serums and even some neutral serums are able to influence morbid conditions due to different viruses.

Thus the inferences are not beyond criticism, though the suggestive value of Hekman's series of cases must be recognised. If one admits the theory of a double virus according to which encephalitis results from the association of vaccine virus and of a virus *x*, then, whichever immune serum is the first to neutralise may be able to abort the morbid process. Such an explanation would in any case throw into relief the importance of the part played by the vaccine in the pathogenesis of encephalitis.

RECOVERY OF VIRUS FROM BODY.

It was formerly thought, and with good reason, that the vaccine was lost in the inoculated regions and circumscribed in the local lesion. Blaxall was the first to show that the virus in vaccinated animals (calf, rabbit, monkey) can be extracted from the blood, the liver, and the brain after an interval which varies according to the species. When it was found in England that the vaccinia virus had been recovered post mortem from the brain of several of the encephalitics, it was consequently no longer possible to conclude that its presence there must have been the cause of the cerebral inflammation. The discovery did no more than demonstrate that in man vaccinia becomes generalised in the system, as it does in animals.[19]

The detection of the vaccinia virus in the tissues and fluids can to-day be carried out with a fine degree of accuracy, and it has been abundantly proved that it is easy to extract the circulating vaccine from the tissues of a vaccinated person or animal. As regards the external surfaces, the virus can be recovered even from the mucous membrane of the upper air passages. In a rabbit vaccinated by the skin, Gins found it in the blood, the viscera, and the bucco-pharyngeal mucosa, from the second to the tenth day following inoculation. No pathogenic effect is produced, however, except at the site of inoculation. The vaccine passes into the blood stream—a true vaccinæmia—and into the parenchymata, invading them, as it were, without the least offensive attack and without occasioning any infective process.

Eckstein and Herzberg-Kremmer[20] have carried out an examination of recently vaccinated children

and revaccinated adults, and alsol of patients suffering from nervous troubles after inocuation. Out of 188 samples of blood taken during the course of a normal vaccination, they have verifled in 47 instances the presence of the virus from the third to the tenth day. In one vaccinated case the virus persisted until the seventeenth day; it was absent in the revaccinated. The results were negative as regards the mucous excretion of the tonsillar region, which leads one to think that the elimination of vaccine by the throat is not as frequent as Gins believed it to be.

It is remarkable that it was never possible to demonstrate the presence of the vaccine virus in 56 samples of cerebro-spinal fluid collected from vaccinated subjects free from complications. But the virus was obtained in two out of five cases with nervous complications, and was also found in the tonsillar region. Hence the deduction that the affection of the nervous centres might be due to an invasion of the cerebro-spinal fluid which has failed in its function as a barrier to myeloencephalitis. The facts are not yet sufficient to place this proposition on a firm basis. Moreover, in vaccinated animals the brain harbours the virus, and it can be found in rabbits in the cerebro-spinal fluid even when the vaccinal condition progresses in the normal way. Gins [21] detected the persistence of the virus in the blood and spinal fluid of two human cases on the twenty-fifth and twenty-sixth day. One of these vaccinated persons was suffering from tuberculous meningitis and the other from cerebral syphilis, and the author considers that this departure from the normal might be explained by the delay which these morbid conditions would cause in the elimination of the virus. This question can only be thoroughly examined in the light of further research on the production of encephalitis by the vaccine virus in animals.

EXPERIMENTAL ENCEPHALITIS OF VACCINAL ORIGIN.

Susceptible animals submitted to cutaneous inoculation do not show cerebral complications during or after the evolution of the vaccinal process. Their position is the same as that in the human subject before post-vaccinal encephalitis was known. Observation and experiment have never shown encephalitis in the most susceptible, such as the calf, which provides the lymph of the institutes, or the rabbit which is the laboratory touchstone of vaccinia.

Such exceptions as can be gleaned from literature confirm by their extreme rarity this rule of brain tissue being unaffected by vaccination. We have only found the two following. Van Bouwdijk Bastiaanse,[22] in examining a calf killed 11 days after inoculation, found lesions in the brain similar to those of post-vaccinal encephalitis in man. This single and isolated case is not very convincing. Flexner [23] reports, from a personal communication from C. Rhoads, that two rabbits inoculated with a neuro-testicular vaccine which produced severe cutaneous lesions died with marked nervous symptoms—a meningo-encephalitis, confirmed post mortem—whereas the other organs were apparently not much affected.

Normally, and as a general rule, there is no such thing as internal vaccinal metastasis; the brain, like other viscera, remains indifferent to the virus which bathes it. For these organs to be affected there must be direct inoculation of the lymph, and even then the brain often resists the injection. As a general rule, successive passages through the brain of a rabbit are necessary for the cultivation in its substance of the neurovaccine of Levaditi. The cunicular encephalitis thus produced has characters indicating a violent inflammation, accompanied macroscopically by signs of irritation. Do the microscopic lesions possess the histological stamp described by Perdrau? Aldershoff, Pondman, and Pot,[24] experimenting with rabbits and monkeys, have produced cerebral inflammations, the lesions of which do not correspond to those which appear in the brains of encephalitic children following vaccination. Lymphs which have been the cause of encephalitis do not even possess any marked neurotropism; several of them were of quite a low virulence and had no action on the brains of rabbits. Weston Hurst and Fairbrother,[25] following research carried out on rabbits in which they produced encephalitis by direct cerebral inoculation, conclude that human and animal encephalitis show altogether different histological characteristics. It has never been possible to provoke encephalitis by cutaneous inoculation, even after submitting the nervous system to slight trauma. These authors deny that there is an encephalitogenic, or even a neurotropic, property in vaccine virus.

Whatever may be the reasons, this resistance of the brain to vaccinal phlegmasia is an established fact. Lædingham and Barratt, by injecting large doses of neurotesticular vaccine into the veins of rabbits, have produced local and visceral reactions; but the brain remained unaffected.

Such then was the knowledge obtained by observation and experiment until the recent work of Eckstein [26] which opened a new horizon to experiment and pathology. Eckstein turned his attention not to rabbits, the ritual animals, but to monkeys. These had already been employed by other investigators, but instead of using the usual channels of inoculation, the failure of which to produce encephalitis was notorious, Eckstein adopted the intrathecal route. In this way, he claims to have succeeded in producing a disseminated meningo-myeloencephalitis clinically and histologically identical with human post-vaccinal encephalitis. There was no failure, since of 16 monkeys injected with several varieties of lymph, all fell ill, even after very small doses, whilst of three animals injected with massive doses of lymph into the arteries none presented similar signs.

These results require to be confirmed, the more so as they are in opposition to the present histological evidence according to which the vaccine virus inoculated directly into the brain produces lesions which differ from those of post-vaccinal encephalitis. Can any inférences applicable to the human cases be drawn from these experiments. Have these resulted from the invasion of the cerebro-spinal fluid by the virus? If so, it should be proved from a sufficient series of cases systematically examined that in normal vaccination the virus is not detectable in the cerebro-spinal fluid, but that it is to be found in the vaccinations followed by bad results. One would then arrive at the following pathogenic mechanism: the invasion of the brain is promoted by the vaccine which, surmounting the vascular barrier, invades the fluid medium which surrounds and protects the nervous centres. Why and how the function of these protective barriers is deranged would still remain to be explained.

Conclusions of Part I.

What has been said above shows that there are weighty reasons to inculpate vaccinia itself as the author of the encephalitic process; these reasons nevertheless are not sufficiently strong to be generally convincing. It is repugnant to believe that an operation whose innocence in this respect has been shown by 100 years of world-wide experience, and which every year continues to be performed by the million without any ill-effect, should be capable of such wrong-doing. How, it is asked, can one implicate the lymph which, in its country of origin, has never produced nervous troubles, but which, transported to another country in which encephalitis exists, has been followed by accidents? For instance, the vaccine imported from Denmark, where no case had been observed, caused in Holland as much encephalitis as the native strains (Peter Holst[27]).

This extreme rarity and the caprices of incidence make the idea of attributing the causation of the encephalitis to the lymph repellent. Others have turned to the invocation of dysergies of the virus and have called in aid factors which bring the infectious process into play—hyperergia; allergia; parallergia;

explosion of antibodies; anaphylactic shock and phylactic failure—but without coming nearer the solution of the problem. Nor have we advanced it by invoking mutation of the virus, or individual defensive power.

We are certain that a virus is concerned. If vaccinal virus is not guilty, where is the other to be found? This virus *x* remains unknown. It would be one which would engender the encephalitis in bivalent symbiosis with the vaccinal. The vaccinal does no more than cause the occult virus to spring into pathogenic activity, in the same way as the priming causes the explosion of the powder. A mysterious virus, living and moving in a complete physiological silence, only revealing its morbigenic force when in catalytic contact with cow-pox.

A check to this hypothesis, probable or not in pure theory, was the absence of other forms of encephalitis comparable to the vaccinal. It was difficult to understand how a really encephalitogenic virus could have no effect by itself and could only exert its influence when aided by vaccinia. This objection has recently been removed by the study of post-infectious encephalitis and acute spontaneous disseminated encephalitis. Here, then, is a further aspect of the problem to be considered and another key to its solution.

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(To be concluded.)

A USEFUL CATALOGUE.

WE have received from Messrs. Mayer and Phelps their new catalogue of surgical instruments and appliances. These are mostly made in a factory behind the premises in New Cavendish-street, so that, with few exceptions, all the articles in the catalogue are of British manufacture. The productions of the firm practically cover every medical or surgical emergency, and it is noticeable in the catalogue that a great many of the instruments have been made, or are being made, according to particular specifications from well-known practitioners. The catalogue is prefaced by some interesting and practical notes upon the value and limitation of stainless steel for surgical instruments.

NEW PREPARATIONS.

EPHEDROL (Messrs. Clay and Abraham, Ltd., Liverpool).—This preparation of ephedrine, the formula for which is: ephedrine 1·0, camphor 2·0, aromatic oil q.s., neutral oil add 100, is supplied in a bottle with a rounded nozzle from which the fluid is inhaled or sniffed. The physiological effects of ephedrine are similar to those of adrenalin, but the action is more prolonged. It enjoys good repute in the treatment of asthma, for the remedy of which it is said to have been employed for 1000 years in China, its home country. When applied to the congested nasal mucous membrane ephedrine reduces turgescence without causing local irritation.

UROSELECTAN B.—Messrs. Schering, Ltd., 3, Lloyd's-avenue, London, E.C., have sent us a sample of the preparation termed Uroselectan B, which is now frequently employed as a contrast agent for the radiographic visualisation of the kidneys and urethral tract by intravenous injection. Chemically it is a di-sodium salt of 3·5 di-iodo-4-pridoxyl-N-methyl-2·6-dicarboxylic acid and is supplied in ampoules of 20 c.cm. solution ready for use. At a meeting of the section of urology of the Royal Society of Medicine, held in March, 1931 (vide THE LANCET, April 4th, 1931, p. 757), Prof. A. von Lichtenberg, of Berlin, delivered an address on excretion urography, in which he reported upon the results obtained in the employment of several new intravenous contrast substances, and spoke of the decided advantages obtained through uroselectan B.

MERCOLLOID.—We have received from Messrs. Coates and Cooper, Ltd., 94, Clerkenwell-road, London, as agents for The Bio-Chemical Laboratories, Ltd., Locarno, Switzerland, samples of Mercolloid, a preparation of colloidal mercury sulphide for which a special spirochætal value is claimed; in the view of the manufacturers the drug is indicated in syphilitic and parasyphilitic affections of every kind. Its value in psoriasis is also stressed. The preparation is a colloidal mercury sulphide in finely dispersed pure suspension, made up in ampoules of 2 c.cm., each ampoule containing 0·010 g. colloidal mercury sulphide. Intramuscular injections are made daily, or at other time intervals as directed by the practitioner.

PERCAINE CIBA (Clayton Aniline Co., Ltd., 40, Southwark-street, London, S.E.).—A sample of this preparation, a 2 per cent. isotonic solution of percaine "ciba," is supplied in a 30 c.cm. bottle. Percaine, as we said in these columns on its introduction as a new local anæsthetic, should be a valuable adjunct to the agents available for producing local analgesia, and during the two years that have elapsed we have heard no reports of ill-effects from its employment. The solution of the strength now supplied has been specially introduced for surface anæsthesia of mucous membranes in oto-rhino-laryngological work, and may be applied by dabbing, painting, or as a spray. A recent article in the *British Medical Journal* (Nov. 28th, 1931, p. 986) by Mr. M. C. G. Israel, M.Sc., and Dr. A. D. Macdonald has confirmed the claims of the manufacturers that the solutions can be sterilised by heat without loss of strength; they find that sterile solutions are stable and retain full activity for at least several months. The minimal effective concentration of percaine for producing surface anæsthesia in the human subject was found to be about 1/40 of that of novocain. The preparation is intended for external use only by application to the mucous membrane.

INSTITUTIONAL TREATMENT OF ALCOHOLISM.

THE superintendent of the Bay Mount Home at Paignton classifies his cases for 1930 into three groups: patients who have become chronic alcoholics for no obvious psychological reason, but as a result of constantly drinking with friends and business

associates; alcoholics who drink for some definite psychological reason (e.g., to relieve a phobia); and the true dypsomaniacs, who develop a periodical craving for alcohol which continues until the patient is saturated and then stops abruptly. The first class of case can be cured for certain in an institution if the patient wishes. Most of the cases in class II. are also curable, but need psychotherapy besides medicinal treatment. During the year the Bay Mount Home received 18 cases in class I., 12 cases in class II., and 2 cases in class III.; also 5 drug cases, 2 cases of obsessional neurosis, 2 of exhaustion neurosis, 3 of neurasthenia, and one ill-defined case of insomnia. The medical superintendent declares that every year that passes strengthens his opinion that almost any case of inebriety can be cured if the patient can and will give the time and make the effort necessary. Patients who have been treated successfully often return periodically for ten days or so to have tonic treatment, and this habit has proved very valuable to them.

STERILITY OF HANDS IN MIDWIFERY.

IN the course of a paper read before the Edinburgh Obstetrical Society on Dec. 9th, Dr. Lachlan Grant reviewed the possible sources of infection in childbirth. In deliveries conducted in the home, he said, several basins, enamel or porcelain, are usually employed. These may be boiled, scrubbed out, or flamed with spirit. Thereafter an unmeasured quantity of disinfectant is poured into an unmeasured quantity of water and the lotion is supposed to be ready for immediate use. The interior of the receptacles is rendered slightly more sterile by this means, but the difficulty is that the basins are very liable to contamination *anew* owing to the cleansing, swabbing, and rinsing. The completely sterile basin can only be produced by constantly subjecting it to steam heat or by keeping it in contact with a suitable chemical solution for adequate periods. If microbes are deposited in freshly prepared solutions of, for instance, perchloride or biniodide of mercury 1/1000, five to ten minutes must elapse before the solution is rendered sterile and quite safe for further use.

One of the most effective methods to adopt, both in the home and in institutions, is to employ some form of elevated water flushing apparatus. What is required is the same type of faucet as that used in operating theatres, so that contact with the unclean sides of the basin walls is avoided. The portable spray which Dr. Grant described consists of separate rubber joint attachments to both hot and cold lavatory-basin or bath-tap inlets. These are fixed by a screw and rubber join. The junction of the hot and cold rubber tubes is not far from the spray nozzle, and the combined spray is supported on a pedestal; by means of a non-return valve in the hot-water tube the temperature of the flowing spray is easily regulated. Where tap unions are found unsuitable, or where a portable spray is not at hand, it is necessary to find an appropriate substitute. The following apparatus, in Dr. Grant's opinion, is simple, safe, and efficient. A large irrigating jar or reservoir is elevated some six feet, supported on a stand or shelf. It has a draw-off tap at its lower end, and is fitted with a rubber tube to which is attached a small neat strong glass or nickel spray or jet. The spray is supported centrally over a wide-mouthed basin or bath some 20 in. in diameter and placed on a stool or chair at a height to avoid splashing. This bath receives the soiled fluids falling from the washed gloved skin or instrumental surfaces, and there is no possible reapplication of bacteria. Antiseptic solutions can be used, and the flow is available alongside the patient's bed—a great advantage. An electric portable immersion heater can at times be used to keep the temperature right. For large institutions it would be possible to have fixed electric heating unit reservoirs on trolleys which could be wheeled to any bedside.

Instead of an elaborate make of reservoir with a lift-up lid and special draw-off tube, Dr. Grant suggested that a simple syphon-action arrangement could be used in the homes of patients. The Rotunda douche is exceptionally suitable, the usual glass vaginal douche being withdrawn and a small glass spray taking its place. The jug or ewer reservoir is raised and fixed and the basin to hold the used solution is placed on a stool or chair. The spray hangs centrally over this basin. By means of two jugs or reservoirs, two Rotunda douches, and a glass Y-piece, with the spray nozzle attached to its lower end, one can make use of either sterile water or lotion as required. The same applies to the larger makes of reservoirs for hospital use. Dr. Grant urged that the washing, rewashing, and dipping of hands after contamination in a stationary aseptic or antiseptic solution *in* a basin is not to be compared with the action of the downward spray cleansing. Spray in larger reservoirs can be operated by a foot pedal. At present the flow is started and stopped by hand. To overcome the difficulty of the cleansed hand surfaces coming in contact with the spring clip or handle of the tap, he has prepared small sheets of sterilised paper encased in sterilised envelopes. Larger sheets of sterilised paper may be used for laying out instruments.

Appointments

CRISP, T., M.D., Ch.B. Edin., Medical Referee under the Workmen's Compensation Act for Chorley, Lancaster and Preston County Courts.

EDWARDS, SYBIL O., M.B., Ch.B. Lond., D.P.H., Asst. M.O.H., Lowestoft and M.O. of Schools.

HOWELL, NANCY G., L.R.C.P. Lond., M.R.C.S., Asst. M.O.H., Acton.

Vacancies

For further information refer to the advertisement columns.

Bangor, Carnarvonshire and Anglesey Infirmary.—Jun. H.S. £100.
Birmingham, City Mental Hospital.—Sen. Asst. M.O. and Deputy Med. Supt. £550.
Birmingham, Selly Oak Hospital.—Biochemist. £400.
Birmingham and Midland Eye Hospital.—Res. Surg. O. £150.
Bradford Royal Infirmary.—Two H.S.'s. Each at rate of £135.
Brighton, Royal Sussex County Hospital.—H.S. £150.
Bristol Royal Infirmary.—H.P.'s and H.S.'s to Special Depts. Each at rate of £60. Also Cas. H.S. At rate of £100.
British Guiana.—Two Asst. Govt. M.O.'s. £650.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Doncaster Royal Infirmary.—H.P. and H.S. for Cas. Dept. Each at rate of £175.
Durham County Hospital.—Two H.S.'s. £150.
Glasgow Corporation.—P.H. Dept. Pathologist. £800.
Glasgow University.—Dr. Robert Pollok Lectureship in Materia Medica and Therapeutics. £500.
Gravesend and North Kent Hospital.—Jun. H.S. £100–£150.
Grimsby and District Hospital.—H.S. £200.
Harrogate General Hospital.—H.P. £150.
Harrogate Infirmary.—Sen. H.S. £150.
Hospital for Sick Children, Great Ormond-st., W.C.—Cas. O. £400.
Hostel of St. Luke, 14, Fitzroy-sq., W.—Res. M.O. At rate of £200.
L.C.C.—Sen. Asst. M.O.'s for Hospital Service. Each £500.
Leicester, City Mental Hospital, Humberstone.—Second Asst. Res. M.O. £400.
Liverpool, Alder Hey Children's Hospital, West Derby.—Res. Asst. M.O. £200.
Liverpool Eye and Ear Infirmary.—Ophth. H.S. £120.
Liverpool, St. Paul's Eye Hospital.—Hon. Asst. Surg.
Liverpool University.—Lecturer in Radiology.
London Hospital, E.—Med. 1st Asst. and Reg. £300.
Manchester City.—Asst. Tuber. O. £650.
Manchester, Withington Hospital.—Asst. M.O. £300.
Newcastle-upon-Tyne, Hospital for Sick Children.—Hon. Asst. Phys. and Hon. Asst. Surg.
Queen Mary's Hospital for the East End, E.—Hon. Asst. Surgeon and Physician.
St. Thomas's Hospital.—Phys. to Out-patients.
Sheffield Royal Infirmary.—Ophth. H.S. At rate of £80.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Sen. Res. H.S. At rate of £150.
West London Hospital, Hammersmith-road, W.—Non.-Res. Cas. O. £250. Hon. Obstet. Reg. Also Hon. Asst. Anæsthetist.
Worcester General Infirmary.—Jun. Res. M.O. £120.
York County Hospital.—H.S. to Ear, Eye, Nose, and Throat Dept. £150.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Swinton (Lancs.), Rhynie (Aberdeen), Llanaelhaiarn (Caern), and Guisborough (Yorks. N.R.).

The Home Secretary gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act, for the Districts of the Dewsbury and Leeds County Courts (Circuit No. 14). Applications should reach the Private Secretary, Home Office, Whitehall, London, not later than Feb. 6th.